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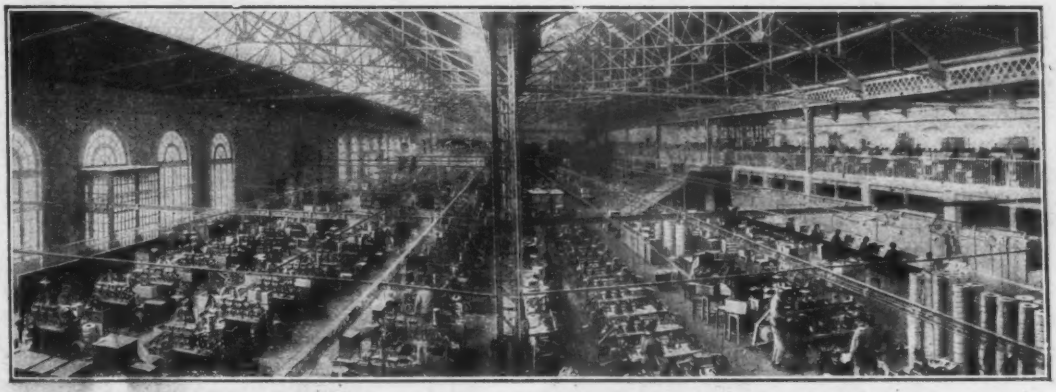

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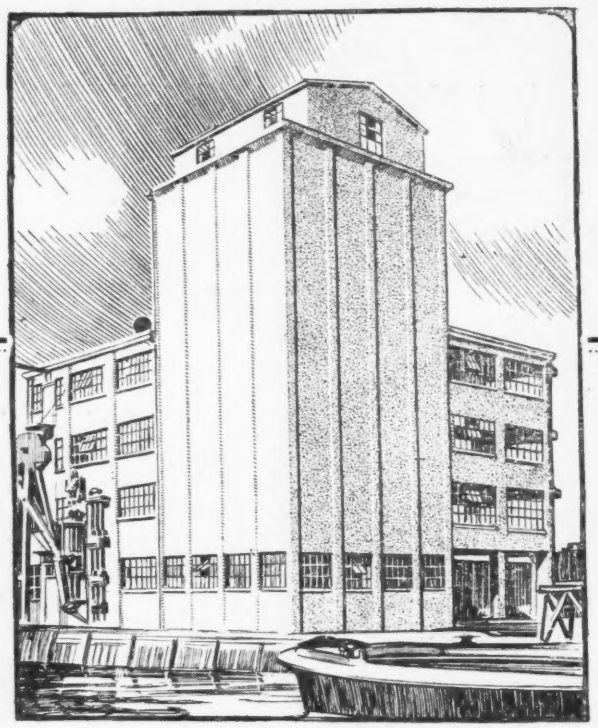

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Vol. III., No. 2

The editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings whenever possible.

June, 1928

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Industrial Research.

THE REPORT of the Privy Council Committee for Scientific and Industrial Research for the year 1926-1927 deals with matters of policy and of special interest, and a summary of work undertaken in the various departments follows.

We note that the much-needed extension of the Low Temperature Research Station at Cambridge has now been made possible by a grant of £35,000 from the Empire Marketing Board. On several occasions we have drawn attention to the extremely useful work that has been carried out at the Cambridge Station, particularly on the fundamental changes which take place during the refrigeration of fish and meat, and during the storage of fruit under various conditions. Work of this kind, so vital to industrial prosperity, should not be hampered by lack of funds, and thanks to the foresight and common sense of the Empire Marketing Board, we may look forward with full confidence to results that will repay many times over the original outlay.

The Report, in its summary of work undertaken in the various departments, intimates, with reference to ham and bacon, that work on the measurement of the heat diffusivity of fat and lean meat has been started; also, on the alteration of distribution of water in the tissues by curing, and on the use of frozen pork for canning. Likewise, a beginning has been made on some of the unsolved problems in bacteriology.

Investigations on the preservation of fish at sea have resulted in the fitting of freezing appliances on some vessels, but large-scale experiments are, as we have several times pointed out, urgently needed.

It is interesting to note that a Report on the manner in which water is held in tissues is being prepared, and that some slow freezing and thawing experiments on quarters of beef are completed. Another point of interest is that discoloration of fat in rabbits was found to be due to an oxidation process, similar chemically to that of linseed oil.

As regards fruit and vegetables, a theory has been formulated relating the good or bad keeping quality of apples to definite features in their chemical constitution; this is based upon accumulated evidence of research work, and suggests that the life expectation of gathered fruit depends upon the amount of living protoplasm contained, and the extent of the sugar reserves accumulated during the growth period. The former determines the intensity of the drain on the latter, death ensuing when the sugar available for the normal process of respiratory combustion in the tissues comes to an end. As a rule, the best keeping apples contain the least protoplasm and the most sugar, and have the lowest respiratory activity.

Synthetic Cream.

The operation of the Cream Preservative Order has brought into the market a synthetic or reconstituted article in imitation of genuine cream. Con-

currently, the sale of the latter has greatly diminished and when (and if) summer comes, it is expected to decrease still further. This question of the sale of synthetic cream is engaging the attention of the Ministry of Health, and the tests available for distinguishing between the real and artificial products are being investigated on behalf of the Ministry.

On May 3, in answer to Viscount Sandon, Mr. Chamberlain said it was a well-known fact that substitutes for cream were commonly used by bakers and confectioners, but so long as these substitutes were not injurious to health, and the articles in which they were used were not incorrectly described, there was no offence in regard to which statutory proceedings could be taken.

The first case relating to an article alleged to be an artificial emulsion of butter offered for sale as genuine cream was heard on April 13 at the Birkenhead Borough Police Court, when a dairyman was summoned for selling as cream an article not of the nature, substance, and quality demanded, inasmuch as it was alleged not to be cream but an artificial emulsion of butter. The Deputy Town Clerk, prosecuting, said this, the first case of its kind, was of great importance; since January 1 the law had prohibited the addition of preservatives in cream, and it would appear that, in order to get round the law, a new type of article had been put on the market known as "re-constituted cream." This cream, the prosecution alleged, was not genuine cream, but an artificial emulsion of butter. When a person went into a shop and asked for cream he expected to be served with fresh cream—that was, milk fats skimmed from the top of ordinary milk. Mr. H. E. Davies, F.I.C., Public Analyst, said that in his opinion the article was not cream but an artificial emulsion of butter. Genuine cream containing such an amount of fat would also contain 4·09 per cent. of solids not fat.—Replying to Mr. Roberts, witness said that bottled cream contained about 50 per cent. of fat. He agreed the article contained 52·97 fat. If it had been natural cream it would have turned sour in twenty-four hours, whereas it did not turn sour within a week.—Mr. J. Roberts (defending) contended that it was entirely because of the fact that the Public Analyst did not find a larger percentage of solids not fats that he suggested the article was not proper cream. According to the regulations cream was "that portion of milk rich in milk fat which had been separated by skimming or otherwise and was intended for human consumption." The Public Analyst had based his opinion on the fact that the cream kept a longer period than expected without preservatives.

The creamery that supplied the dairyman denied the use of butter and of an emulsifier in connection with the preparation of the alleged substitute for cream. The magistrates, after retiring, said they considered the summons had not been proved, and dismissed the case. They also ruled that the prosecution was justified in bringing the case, and dismissed the application for costs. A similar summons against another dairyman was likewise withdrawn.

Preservatives and Cream.

There is not the slightest doubt but that the Cream Preservative Order has come to stay. Sir J. Gilmour, replying on May 2 to Mr. T. Kennedy, said he had received representations from traders in Scotland regarding the effect of the regulations prohibiting the use of preservatives in butter and cream. He had also received representations supporting the prohibition of boric acid in cream. He saw no reason to modify the restriction on the use of preservative for these articles.

We find ourselves in agreement with Dr. James Fenton of Kensington, in that, having regard to the process of preparation of cream, which under modern methods is a rapid one, there does not appear to be any justification for taking the retrograde step of again permitting the addition of preservatives to cream, when such cream is intended for consumption in its natural state.

Dr. Fenton, in his monthly report, states that 59·3 per cent. of the samples of cream taken in Kensington from 1908 to 1928 were free from preservatives. Indeed, since 1921, it has been found that in the better class dairies the sale of preserved cream has been discontinued, which fact undoubtedly proves that it is possible to carry on the cream trade without the use of preservatives. It has been the practice for some time past for retailers to obtain their stocks of cream daily instead of bi-weekly or even weekly, as was the previous custom. Since January 1 last seven samples of cream have been analysed by the Public Analyst and every one was found to be free from preservatives. Enquiries made of cream retailers have shown that the new regulations have not resulted in much loss by reason of the cream becoming sour.

New Preserving Processes.

There is another point to be kept in mind—namely, that the resources of science are by no means exhausted; given a definite requirement, particularly in such a case as this which involves the public health, the chances are that we shall not have long to wait until some way of processing cream to prevent souring has been worked out to the satisfaction of everybody. Of course, there are difficulties to be overcome—which were reviewed in last month's issue by Mr. Lord—but these only serve to intensify the interest of the scientist and inventor; it is like putting a particularly difficult cross-word puzzle in the hands of an enthusiast—especially if there is an attractive prize in the background.

Already there are signs to indicate the general trend of inventive effort. A plant has been developed by a scientist, Mr. Samuel Grasse, and manufactured in Glasgow by a firm of engineers, Messrs. James Howden and Co. (Limited), for thermally treating cream to prevent souring. Recently a demonstration was given at Cumnoch Creamery. It is stated that this plant, which occupies about 5 by 7 feet of floor space, can treat 200 gallons per hour, or about 1,500 gallons per day. It is claimed that the treated cream undergoes no change of colour, taste, or body, and that it whips as well as any cream on the market, and that tests have shown that in all seasons and under all conditions cream so treated will keep longer than chemically preserved cream. Under special conditions, it is said that its keeping qualities may be prolonged for more than six weeks. Cream which had been lying for nine days in an uncovered cream-jar at a temperature which was sometimes as high as 70° was found to be quite fresh and sweet. At the demonstration the time taken to treat thirty gallons was nine minutes. The only requirements for installing the process are normal supplies of steam and of cold water. Milk, also, can be treated.

But this is only one of the many attempts which are being made along several lines to solve the problem. Some are in the "test-tube" stage; others have arrived at a semi-commercial stage; it is quite possible that the process to which we have referred will prove itself as successful commercially as it is technically.

Californian Food Research.

For more reasons than one, it is useful to know what countries outside our own are doing to further the advance of knowledge relating to food products in general. On several occasions we have referred to the work carried out by Professor W. V. Cruess and his associates at the Fruit Products Laboratory at the University situated in Berkeley, California; much of this work has been carried out on a semi-commercial scale, and there is not the slightest doubt but that it has helped very considerably not only the local fruit and related industries but also those in many other parts of the world.

The Food Research Institute of Stanford University, also in California, is another organisation to which all interested in the production of food are indebted for a great deal of valuable information of a directly practical nature. Founded in 1921, this Institute was an outcome of war experience, in that the war forced upon nations the necessity of intensive studies in food production and distribution in their economic as well as their scientific aspects, no less important in peace than in war. The broad purpose of the Institute is to build up and make available an accurate and increasingly comprehensive body of knowledge concerning food production, trade, consumption, and prices. The scope of the research is not limited to the United States, and special attention is given to international problems. The Institute has co-operated with the Bureau of the Census and the Department of Agriculture in their efforts to improve the statistics of flour production, the baking industry, wheat and flour stocks, and oils, and fats. One outcome of its activities is an annual review and periodical surveys of the world wheat situation. Already a considerable number of very useful publications have been issued, reprints of which may be obtained upon request. Recently, we received a copy of a comprehensive treatise on copra and coconut oil, compiled by Miss K. Snodgrass, who is a Research Associate of the Institute.

Starch in Bread Making.

Now, we note that Professor Carl L. Alsberg, one of the Directors of the Food Research Institute, has produced a book entitled, *The Rôle of Starch in Bread Making*. This well-known authority points out that though starch is nearly four-fifths by weight of flour, scant attention is paid to the part played by starch in dough and bread. This he attributes to the widespread belief that all starches are essentially similar and that, except for furnishing fermentation material, starch acts merely as inert matter until the oven's heat gelatinises it. The purpose of the treatise is to inquire if such assumptions are justified.

There is abundant evidence that starch, far from being a uniform material throughout the vegetable kingdom, is probably a complex mixture, varying in the proportions of its constituents, certainly from genus to genus, and perhaps even from variety to variety of the same species.

Then, again, starches may behave in different ways merely because the sizes and shapes of the granules are different. Even though the chemical composition and the colloidal condition of two samples are identical, their physical properties when converted to paste may be different, because the mean size of the granules and the degree to which they swell may differ. It has been found that the size of the starch granules is different for different kinds of wheat—in general the strongest wheats have the smallest granules—and it seems certain that in regard to the "viscosities" of their pastes, starches from different samples of wheat are different. Furthermore, we know that the starches of different species of wheat absorb varying amounts of moisture, but we do not know whether those of different varieties of the same species do so—probably they do.

Diastatic Power of Flours.

The diastatic power of a flour is dependent upon four factors at least: (1) The numbers of mechanically injured starch grains it contains; (2) the ease with

which its uninjured grains are attacked; (3) its diastatic content; and (4) the localisation and character of its diastase. Each of these is fully discussed by Professor Alsberg. Reasons are given why severe grinding increases the diastatic power of flours. Discussion ranges over the location of diastase in flour, the baking quality of flour fractions, the diastatic action and alteration of granules during baking, the bread staling process, and starch retrogradation, the retention of water in the baking loaf, and many other matters of great importance to both miller and baker.

Canadian Fish Packing.

Stabilisation on a prosperous basis of the fishing industry on the Pacific Coast of Canada is expected to result from the amalgamation of the British Columbia Fishing and Packing Co., Ltd., and the Gosse Packing Co., Ltd. This will be accomplished through the formation of a parent company to hold their common stocks, to be known as the British Columbia Packers, Ltd.

The British Columbia Fishing and Packing Co., Ltd., with a capitalisation of $5,000,000 is the largest salmon-canning concern in the British Empire, and has been operating in British Columbia for over thirty years. The Gosse Packing Company, the second largest canning concern in the province, was formed fifteen years ago and has a capital of $2,000,000. The new company will be capitalised at $8,000,000.

We have received from the Department of Marine and Fisheries, Fisheries Branch, at Ottawa, a copy of the Meat and Canned Foods Act and the Regulations which govern the canning of fish in Canada.

Hams, Humanity and Humbug.

Recent activities of the Royal Society for the Prevention of Cruelty to Animals have brought forth a torrent of scorn and indignation from our old and respected friend, Mr. D. J. Anthony, one of the greatest authorities on veterinary science applied to the bacon and ham factory. The cause of all the trouble is an announcement by the R.S.P.C.A. to the effect that the superior keeping qualities of meat from animals killed by the so-called "humane" methods (*i.e.*, shot animals) have been proved by a simple experiment which consisted in sending five hams, said to have been cut and cured from shot pigs, on a trip round the world; on their return these were examined and found to be "perfectly sound." This simple and isolated experiment is apparently meant to disprove for all time the contention of the wicked and cruel bacon curers that meat from shot pigs is inferior in some way to that from pigs "stuck" by a knife in the usual manner.

But, before forming our own judgment upon the inferences to be drawn from this experiment, we should require to know the particular conditions under which the experiment was conducted. If these are not known, then the great experiment is a somewhat ludicrous affair and the money expended upon it could, in Mr. Anthony's view, far better be expended in the cause of humanity.

We agree with Mr. Anthony; it is time all "humbug" was abandoned over this question of "humane slaughtering," and an impartial Government investigation carried out by competent men on a scale sufficiently large to determine once and for all time the best method to be adopted in the slaughtering of food animals, consistent with the requirements of good keeping qualities in the meat.

Address on Food Supply.

In the course of an address on "Our Food Supply from the Public Analyst's Point of View," delivered by Mr. A. R. Tankard to the Hull Chamber of Commerce, an interesting comparison was made between the adulteration practices of 100 years ago and those of to-day. Substances such as sulphate of iron, quassia, and wormwood were added to beer, wine, and other alcoholic liquors to give "bite" to them. Fines amounting to £500 were not uncommon. Cream frequently consisted of a paste made from boiled arrowroot or rice; vinegar often contained sulphuric acid; custard was flavoured with cherry laurel leaves; sweets sometimes contained clay, red lead, and green copper compounds. Roasted peas and beans were substituted for coffee beans; peppercorns were made from linseed cake, clay, and cayenne pepper.

Certainly we have progressed! Greater knowledge and a keener moral sense have resulted in an infinitely greater amount of honest dealing in the business of food production.

Some Forthcoming Articles

The Manufacture of Pickles.
Protein Digestion.
Spoilage of Preserved Meats.
Power Economy in the Food Factory.
Twice-Made or Pasteurised Cheese.
Scientific Control in the Flour Milling Industry.
Fruit Juice Powder.
The Culture of Mushrooms for Profit.

The Salmon Canning Industry

By ERNEST D. CLARK, M.A., PH.D., DIRECTOR,

AND

RAY W. CLOUGH, M.A., PH.D., CHEMIST,

North-West Branch, National Canners' Association, Seattle, Washington, U.S.A.

Last month the authors gave what may be well described as a thrilling account of the life history of the salmon and the methods employed in its capture in the famous fishing grounds of the North Pacific Ocean. Below they bring before us a vivid picture of the plant and processes used at the Western Canneries.

PART II

A Salmon Cannery with Characteristic South-Eastern Alaska Background.

(Courtesy of "Pacific Fisherman.")

Birth of the Salmon Canning Industry

IN 1864, in the midst of the American Civil War, a man engaged in fishing on the Sacramento River in California conceived the idea of preserving the fish by canning them. A friend of his in Maine on the Atlantic Coast had experimented with canning various products, and was persuaded to go to California with his outfit. The art of canning, although already practised for some sixty years, was still a very small industry, hardly more than in the experimental stage. A few things were canned in Europe, and still less in New England, but canned foods were looked upon with suspicion and entered into the food supply only in a very limited way. The canning of fish was at first extremely crude. The cans were made by hand by a tinsmith, who could make only a few dozen each day. The fish were butchered, cleaned, cut up, and placed in the can, all by hand labour, and were finally pushed through

a small window into a mysterious room, where they were cooked by a process whose nature was jealously guarded. Later the process became generally known, and was found to be very simple. The closed and soldered cans were cooked in a boiling water bath for about thirty minutes and the cans, swollen by the steam inside, were punctured by a sharp awl. The steam rushed out, the small holes were again closed (with solder), and the cans cooked for an hour longer. Finding that enough heat could not be obtained with boiling water alone in a reasonable period of time, salt was added until the boiling point of the brine was brought to a temperature of approximately 230° F., which is about 10° lower than that now used. This heat was sufficient to soften the large backbones in a much shorter time and to render the fish sterile so they would keep indefinitely. In order to keep these first cans from rusting they were frequently painted red, and from this it is thought the prevalent red label for salmon developed.

The demand for this new food product developed rather rapidly, and it was necessary for the industry to expand. A good trade sprang up with England, and the canned salmon was taken in sailing vessels around Cape Horn along with barrels of salt salmon. Several canneries were soon built on the Columbia River, and then in 1878 a trading company, maintaining a post in Alaska, started a cannery there, the first north of the Columbia River. The industry continued to spread, and canneries sprang up all along the coast from Central California to Bristol Bay. At first only the red salmon was canned, but as the supply of this became inadequate to the demand, the other species, also high in food value but not so bright a red, were canned until in time all five species were available in the markets of the world. But hand labour was not capable of packing enough salmon in the short summer season and machines were developed of increasing complexity and skill until those now in use are little short of marvellous. Machines for making cans were also built and the soldered can done away with. At the present time no solder comes in contact with the contents of the can, and there is now absolutely no danger from lead poisoning, as was sometimes formerly charged. New methods of fishing have also been developed.

Fish Cannery, Butedale Lake, B.C.

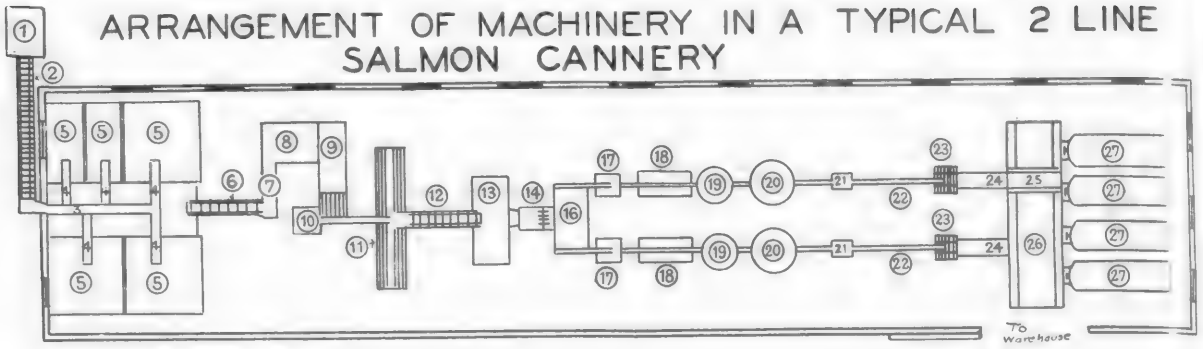
(Courtesy of the High Commissioner for Canada.)

Dominion Cannery, Inverness Passage, B.C.

(Courtesy of the High Commissioner for Canada.)

A Visit to a Salmon Cannery

Let us visit a fish cannery and follow the salmon from the cold, clear water of the North, through the cannery, and to the markets of the world. We obtain permission to go out on the cannery tender after fish, and slipping away from the cannery dock in the grey dawn, just as the sun's first rays are driving away the fog, we pass along through silvery waterways, beneath towering, tree-clad mountains, until we arrive at a fish-trap. This is constructed of long piles driven into the bottom, joined with wire netting, extending several feet beneath the surface of the water, and so placed as to lead the fish along until they enter a heart-shaped enclosure, from which a small opening leads into a second smaller enclosure of the same shape. This again opens through a narrow tunnel into a still smaller basin called the "pot," beside which is another square enclosure of the same size, known as the "spiller." The fish which enter this cannot find their way out and congregate there in large quantities, sometimes as many as 100,000 in a single trap. Once the salmon enter the labyrinth commencing with the outer heart their fate is sealed; there is practically no chance for them to escape. As we draw alongside the spiller of this trap the fish may be seen leaping in thousands in the water below. A bailing net is let down in such a way as to enclose hundreds of the fish, and they are hoisted, a gleaming, silvery, struggling mass, and lowered into bins in the vessel's hold. Sometimes scows are used and towed to the cannery. Thirty thousand fish is not an unusual load for such a scow. Some of the traps are floating traps, which are somewhat cheaper in cost, and may be used in deeper water than those built of driven piles. On the way back to the cannery we pass fishing boats, which let out a purse seine in an immense circle around a school of fish, and then gradually draw in the ends until the fish are crowded into a small area, when they are drawn into the boat and taken to the cannery. We also see trolling boats, each equipped with four poles extending out from the sides. A line ending in a spoon hook is attached to each of these poles and two other lines are usually



run over the stern of the boat. The king and coho salmon are caught in large numbers by this method, but the other species do not take the hook.

Arriving at the cannery, the fish are raised to the fish-house by conveyors (2, 3, 4)—see diagram—and placed in piles on the clean, well-washed floor or in separate bins (5), according to species. Fish on scows are usually washed into the conveyors by streams of water from a hose, as this is less likely to bruise them, but fish in the holds of boats must be placed on the conveyors by one-tined forks, called "pughs"; however, care is taken to insert this only in the head or tail of the fish, so as not to bruise or cut the flesh.

Although still early in the morning, steam is up in the cannery, and the crew all at their stations, so that as soon as the first fish arrive the work of canning can begin. The door to one of the bins is partly opened, and, since the floor of the bin is inclined, the fish slide to a centrally located elevator (6) and proceed along a chute (7) and tables (8, 9) to the butchering machine called the "Iron Chink" (10). This machine acquired its name from the fact that it displaced several Chinese who cut and cleaned the fish in the early days of the industry. This truly remarkable machine grips each fish, adjusting itself to the varying sizes, severs the head and tail, cuts off each of the six fins, splits the body, and removes the viscera; and all at the speed of sixty per minute. The body of the fish drops on one belt conveyor, while the waste parts pass by means of another to the reduction plant, from which they shortly emerge in the form of clear oil suitable for food or soap, and dry fish meal for cattle and poultry food. Meanwhile, the salmon body has been thoroughly and carefully washed under streams of clear water by workmen at the sliming tables (11), and is now carried by an elevator (12) to a tank of water (13). It is then placed on an elevator, which forces it up and through a gang of revolving circular knives (14), which cut it into pieces of suitable length for the cans. These pieces, falling into a bin (16), proceed at once to the filling machines (17), where they meet the cans, which come rolling down a runway from the floor above, receiving the proper amount of salt as they pass the salting device. Tightly packed with salmon, the cans come from the filler at a speed of 70 to 120 a minute, and pass between two lines of critical examiners at the inspection table (18), who remove and adjust any cans which are not properly filled. Passing on, the cans go to a clinching machine (19), where the covers are loosely crimped on, and in some canneries they pass through a steam box, in which they are heated and most of the air still remaining in the can replaced by steam. This is for the purpose of producing a vacuum in the can after it has been closed, cooked, and cooled. From the steam, or exhaust, box the can goes but a few feet to the closing machine, which rolls the clinched seam again and makes it air-tight. Recently invented vacuum closing machines (20) do away with the exhaust box by admitting the cans through airports to chambers from which most of the air has been pumped, and there the covers are tightly rolled on. Both methods properly carried out result in a satisfactory vacuum in the finished cans, but since the vacuum closing machines take much less space, and have other advantages, they seem to be rapidly gaining in favour. From the closing machine the cans pass through a washing device (21), roll down an incline (22), and are arranged in iron trays (23), which are placed six, ten, or twelve deep (according to the size of can) on little cars, three, four, or five of which are pushed into a long, horizontal, cylindrical retort (27). A system of stationary (24) and movable tracks (25), the latter operating in a pit (26), facilitates the handling of loaded cars to and from the various retorts. Some 4,300 cans are cooked at one time in a single retort. Many of the retorts are equipped with temperature control devices which assure the proper

Salmon Cannery, showing Snow-Capped Mountains, Chignik, Alaska.

cool. The cook in general use, and from which there is very little deviation, is for ninety minutes at a temperature of 240° F. This temperature is attained at a steam pressure of about ten pounds, provided all air has first been allowed to escape from the retort through properly placed pet-cocks. After cooking, the cans are passed through a weak lye-bath to remove any adhering grease, and then through fresh water. After cooling, and as time permits, the cans are labelled and placed in cases for shipment to all parts of the world. In general, the outline given represents the usual salmon cannery practice, but, of course, there are variations in the individual canneries.

Typical Salmon Cannery in South-Eastern Alaska.
(Courtesy of the "Pacific Fisherman")

Judges in the Confectionery Section of the Exhibition

The following gentlemen have consented to act in the capacity of Judges at the Exhibition which is to take place this year at the Royal Agricultural Hall from September 8 to 14: Messrs. J. Coole, Walsall (Chairman); F. Starkey, Birmingham (Vice-Chairman); A. G. Bromley, Barnstaple; W. J. Chalkley, Woodford; J. Cairns, Berwick-on-Tweed; R. J. Hollingham, London; G. Joyce, Seven Kings; J. J. N. Jackman, Hull; G. H. McKay, Liverpool; A. J. Morgan, Port Talbot; F. Nott, Letchworth; G. A. Stapleton, Leeds; H. G. Stiles, St. Ives; S. H. Stanton, Hednesford; and Ald. S. Stephens, J.P., Plymouth. It will be noticed that that world-renowned prize-winner, both in confectionery and bread, Mr. J. J. N. Mackman, of Messrs. Jackson and Son of Hull, has consented for the first time to act in the Confectionery Section at the Exhibition. Mr. Mackman's help in this capacity will be much appreciated by all interested; at the same time, the goods which are invariably entered by Mr. Mackman will be much missed.

Composition of Foods

THE FOLLOWING is a summary of the researches carried out at the Physiological Department of the Italian University at Rome by L. Settimj, under the direction of Professor S. Baglioni, on the chemical composition and constituents of various foods in common use amongst the Italian people. The results of the whole investigation appear in *Atti. R. Accad. Lincei*, 1927 (vi.), 6, pp. 315-318.

Samples of various foods were collected from a number of sources and analysed: in the case of canned foods, the date of manufacture is noted. A knowledge of the composition of the foods of the people is highly important from the physiological and economic aspects, as well as the nutrition standpoint. The author has examined the following foods: Canned meat products after two, four, and seven years' storage; fresh lean beef; cheese; fish; lean bacon; mushrooms (*boletus edulis*), the latter after drying. The fish foods were found to contain the highest nitrogenous content and also the highest soluble nitrogen compounds, although the mushrooms had the highest amino nitrogen content. From a protein standpoint, the fish has the highest value and the fresh beef the lowest value. However, from the nutrition and energy value point of view, the soluble protein figure must be considered; in this respect, the fish, bacon, and mushrooms are well above the cheese and canned meats. The high percentage of cellulose and carbohydrates in mushrooms requires investigation, so as to determine the nutritive effects of these constituents, and may possibly bring out some factors which have a bearing on the digestive difficulties experienced after eating particular varieties of mushrooms.

The author concludes his researches with several extensive tables giving detailed results of his analyses. The following is a tabulated summary of Settimj's results. It is only to be regretted that the author has not taken the matter further and calculated out the nutrition and energy values of the various foods by the well-known methods. The summarised tables are as follows:

TABLE I.

CANNED MEAT OF VARIOUS AGES AND FRESH BEEF.

Date of Manufacture.	Date Analysed.	Water.	Dry Material.	Total Nitrogen.	Soluble Nitrogen.	Nitrogen as Amines.	Total Nitrogenous Substances.	Proteins.		Fat.	Ash.
								Sol.	Insol.		
Canned Meat, April, 1915 ..	June, 1917	62·00	38·00	5·20	0·854	0·077	32·50	5·33	27·17	2·00	1·[illegible]
Canned Meat, June, 1916 ..	Feb., 1923	62·50	37·50	4·50	1·400	0·120	28·10	8·75	19·35	4·40	3·[illegible]
Canned Meat, Jan., 1919 ..	Feb., 1923	60·00	40·00	4·95	1·3000	0·113	30·90	8·10	22·80	3·70	3·[illegible]
Fresh Beef	1918	72·65	27·35	3·68	0·700	0·140	23·00	4·37	18·62	1·45	1·[illegible]

TABLE II.

CHEESE.

Date Analysed.	Water.	Dry Residue.	Total Nitrogen.	Soluble Nitrogen.	Amine Nitrogen.	Proteins.		Fat.	Ash.	Sodium Chloride.
						Sol.	Insol.			
May, 1917 ..	27·20	72·80	4·35	0·77	0·33	4·81	22·37	26·60	10·60	6·70
May, 1917 ..	31·00	69·00	3·90	1·16	0·47	7·25	17·12	28·20	10·20	6·80
May, 1917 ..	30.80	69·20	4·60	1·25	0·61	7·81	20·94	24·70	11·60	8·50
May, 1917 ..	26·60	73·40	5·14	0·98	0·47	6·12	25·98	25·70	9·00	6·00

TABLE III.

FISH, BACON, AND MUSHROOMS.

The Fish sample was an average from 10 companies.
The Bacon .. .. 6 ..
The Mushroom .. .. 3 ..

	Date of Analysis.	Water.	Dry Residue.	Total Nitrogen.	Soluble Nitrogen.	Amine Nitrogen.	Proteins.		Fat.	Cellulose.	Ash.	Salt.	Carbo-hydrates.
							Sol.	Insol.					
Fish	1918	45·65	54·35	6·00	1·67	1·20	10·43	27·07	0·60	—	15·92	15·4	0·35
Bacon ..	1918	48·90	51·10	4·30	1·40	1·34	8·75	18·12	10·00	—	12·20	11·20	2·03
Mushrooms ..	1918	18·90	81.10	4·26	1·48	1·40	10·30	16·30	0·90	6·80	5·26	—	41·54

Factors Influencing the Baking Properties of Flour

By T. H. FAIRBROTHER, M.Sc., F.I.C.
Chief Chemist, McDougalls, Ltd., Millwall Docks, E. 14.

PART II.—THE INFLUENCE OF FLOUR PROTEINS ON BAKING PROPERTIES

Flour Strength

FLOUR STRENGTH has been variously defined, and, frequently, in an attempt to be comprehensive, the definitions have become cumbersome and involved, but, fundamentally, flour strength is the index of the loaf-producing capacity of the flour. A strong flour (given enough gas) will produce large, well-piled loaves, whereas a weak flour will give loaves of indifferent size. The influence of the strength of various flours on loaf volume is illustrated by the photographs in Part I (March issue), which have been kindly prepared by Mr. E. A. Fisher, Director of the Flour Millers' Research Laboratories, St. Albans.

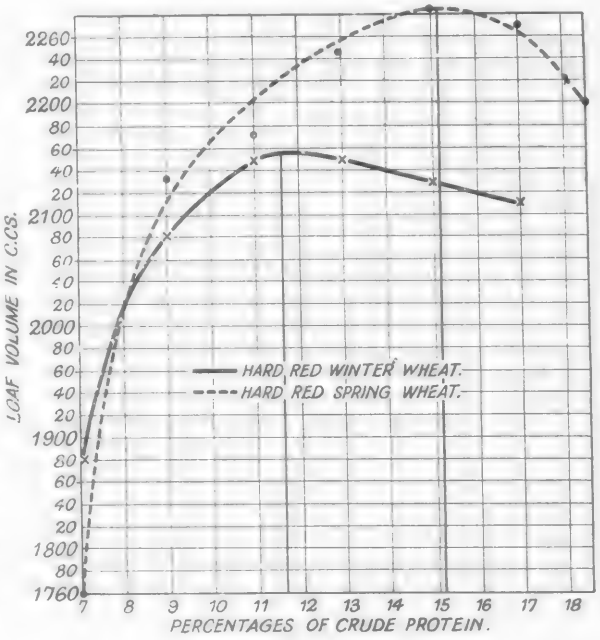
The loaves in the centre were made from the flour of No. 1 Manitoba, a very popular, strong Canadian wheat, and when compared with the loaves from English wheat flour show up much bigger in volume and of better shape and texture. All these loaves were made in exactly the same way, the only difference being the flour. The weakest of the flours was the English biscuit flour, which is not really suitable for bread making, but this is used extensively for biscuits, pastry, and cakes and is popular in self-raising flour. The average English flour, whilst showing a bigger volume than the English biscuit flour, is noticeably inferior to the No. 1 Manitoba in all the essentials of a good loaf. The influence of the strength of the flour on the character of the loaf produced is thus made clear.

Protein Content

The most important factor determining strength is the amount of protein in the flour, and the influence of the protein content on loaf volume is shown in the accompanying graphs, which are based on loaf volumes obtained by Schollenberger (U.S. Dep. Agr., Grain Investigation, 1923), and numerous other workers have obtained similar results. From the curves it is seen that, in both winter and spring wheats, increase in protein content brings about a corresponding increase in loaf volume. In the case of the spring wheat the maximum volume is attained at a protein content of about 15 per cent. and in the winter wheat about 11·5 per cent. After these maxima the loaf volume decreases with increase in protein content. There is thus an optimum protein content in wheat beyond which it is useless to go.

The difference in the curves for the winter and spring wheats is interesting, because corresponding differences are to be observed in the character of the washed-out gluten. In the spring wheats the gluten washes out granular, short and tough, whereas in the winter wheats it is smooth and elastic but not so tough.

The toughness of the gluten as measured by viscosity determinations is a very important factor and a number of very ingenious instruments have been devised for the purpose.



Influence of Protein Content on Loaf Volume.

To revert to the curves; it is noticed that all the points do not fall on a smooth curve, but they approach fairly closely to a hyperbolic curve as far as the maximum point. It is not surprising that the points are not quite coincident with the curve as there is a large experimental error in baking tests, and, moreover, there may be a difference in the diastasic activity of two flours having the same gluten content, which would influence the size of the loaves to some extent. Bailey (*Cereal Chemist*, iii, 1926) has gone further and demonstrated that the increase in loaf volume with each unit increment of protein diminishes with increasing percentages of protein, and that if loaf volume be plotted against protein content the result is a hyperbolic curve which is expressed by the equation,

$$\text{(loaf volume) } y = \frac{x}{a + bx} + c$$

x being the protein content and a, b, and c constants. This work is important as it indicates that there is a maximum optimum percentage of protein beyond which little or no advantage is to be gained by further increase in protein.

The difference in the curves obtained for winter and spring wheats, and the difference in the physical properties of the washed-out glutens, opens up another point—viz., that quality, as well as quantity,

of gluten is important. So far as our present knowledge has extended, the quality of flour has been correlated only with the amount of crude protein determined either by washing out the gluten and weighing, or by estimating nitrogen by the Kjeldahl method and multiplying by 5·7.

Gliadin and Glutenin

Investigations have been made, and are still being actively carried out, to establish some ratio of the component parts of gluten. The most important constituents (as far as quantity goes) of gluten are glutenin and gliadin, and these substances have widely different physical properties and have not the same chemical compositions. It seems to be quite possible that the variations in flour quality may be explained by a variation in the gliadin-glutenin ratio of the crude gluten. Fleurent, who first suggested this, came to the conclusion that the best ratio was 75 gliadin to 25 of glutenin, but other investigations have suggested different ratios.

This widens the problem in the matter of variables. First there must be a definite amount of protein which may be regarded as the quantity factor. Then the ratio of gliadin to glutenin (and possibly the other proteins) is important. This may be regarded as the "quality factor," and it has been suggested that the best index of the baking properties of flour is the product of the quantity and quality factors. Whilst some cereal chemists have expressed the view that the glutenin-gliadin ratio is not of much significance, it should nevertheless be thoroughly investigated, and it is possible that the doubtful opinions have been largely influenced by the very great difficulty of determining accurately the percentages of glutenin and gliadin in flour. Up to the present the separation has been brought about by extraction with solvents and subsequent precipitation, and, as a result, each protein fraction has probably contained small amounts of the other proteins.

Undoubtedly considerably more work must be done on the accurate determination of the constituent proteins of flour before a true scientific explanation of the influence of protein content as a whole on baking properties can be given. One thing is certain, and that is, that the practice of expressing protein as Kjeldahl nitrogen × 5·7 is of little value, and many of the generalisations based on this practice are likely to prove erroneous when a more complete understanding of the real nature of the protein is obtained.

Let us briefly summarise our present knowledge of the proteins of flour in relation to baking properties and see where future progress is to be made.

Summary

All we know with certainty is that the total amount of protein has a very important influence on baking properties.

We also know that wheat contains several proteins, (1) a globulin to the extent of about 0·7 per cent., (2) an albumin (about 0·3 per cent.), (3) one or more proteoses also to the extent of about 0·3 per cent., (4) gliadin, and (5) glutenin.

We also know that the gliadin binds the flour particles together and renders the dough tough and coherent, and that the glutenin imparts a solidity to the gluten and forms a nucleus to which the gliadin adheres. If glutenin is absent from a flour no protein is isolated as the gliadin is washed away. Similarly a flour from which the gliadin has been removed gives no gluten as there is then no binding material to hold the particles together.

We thus know that there are several proteins and that the presence of glutenin and gliadin is essential. How these various protein fractions act separately or conjointly, how they are formed (by enzyme or other agencies), how they may be increased independently or collectively (by fertilisation with nitrogenous manures or other means), what is the optimum ratio of the various constituent proteins, and how this ratio can be controlled and varied at will—these, amongst others, are the problems confronting the cereal chemist in the elucidation of the influence of the protein content of flour on baking properties.

The Canadian Department of Agriculture

The Canadian Department of Agriculture has developed a system of experimental farms, comprising a central station at Ottawa and twenty-two branch farms scattered over the country from the Atlantic to the Pacific Ocean, which is the most comprehensive system of its kind in the world.

Among its manifold activities may be mentioned the special study of dairying. This work includes the trial and introduction of new varieties of cheese, as manufactured in other parts of the world, and also the origination of new varieties. Bacteriological studies are undertaken on clean milk production and numbers of allied problems. The Department of Agriculture has issued instructive booklets on cheese, milk, buttermilk, and these and a list of many other publications may be obtained from the Publications Branch, Department of Agriculture, Ottawa. Another Department which does extremely useful work is the Natural Resources Intelligence Service, Ottawa.

Weighing and Boxing Cheese in a Canadian Factory.

Colouring Matters in Food

By F. W. ANDREWS,
British Dyestuffs Corporation, Limited.

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We give below the third of a series of important articles on colouring matters for foodstuffs. These articles, representing the fruits of many years of specialised experience, set out, in a manner readily understandable by all, the general rules and finer points to be observed by the user in applying colours to foods and, equally important, point out the pitfalls and dangers to be avoided. The application to the various confectionery and meat products is dealt with in detail. Finally, the author discusses the question of purity in relation to food-colours.

PART III.—THE REQUIREMENTS OF THE LAW

GREAT BRITAIN has the unenviable distinction of being the only leading country which possesses no definite legislation specifying the colouring matters that may be used for foodstuffs. Whilst every country of note has made an effort to regulate the use of colourings and many have specified the maximum toxic content their colours are allowed to possess, there is in existence here only one basic law relating to the subject. Endeavours have been made from time to time to supplement and interpret that law by various recommendations, reports, and regulations, but the Sale of Food and Drugs Act of 1875 is the only law in the Statute Book which generally prohibits the use of injurious colours.

The foodstuff manufacturer has been left to his conscience and business instinct for guidance to demand only the purest colours obtainable. In this effort he has been aided by the colour manufacturers, who have made strenuous endeavours to supply him with harmless colours, and it is to the credit of both and not to any legislation, that the purity of British foodstuffs will bear comparison with any in the world.

It is not my object to point out how near the manufacturer can steer to the danger line, but rather to show that, by careful discrimination in the colours he purchases, the danger line need never be approached.

The Sale of Food and Drugs Act, 1875, referred to above, states that "no person shall mix, colour, stain or powder any article of food with any ingredient or material so as to render that article injurious to health." This stood for many years as the only regulation regarding the use of colouring matters in food, and it will be seen that no specific limits were laid down in the Act as to the quantity of injurious matter which a foodstuff colour may contain, and it was left to the judgment of the magistrate, advised by the analyst, as to the correct interpretation of the phrase "injurious to health." In 1903, however, after the arsenic in beer trouble, a Royal Commission was appointed, which reported that, in its opinion, no article of food should contain more than one hundredth of a grain per pound (1·4 parts per million) of arsenic, but no limits were specified as to the quantity of heavy metals or other toxic matter, this being outside the scope of their inquiry. There is no doubt that analysts, in arriving at a decision as to whether the amount of arsenic found was "injurious to health," have been very largely influenced by the Report of this Royal Commission.

The next step was in 1924, when the Government set up a Departmental Committee to investigate the whole question of preservatives and colouring matters in food. This Committee reported that they considered no colour used as an ingredient of a foodstuff should contain more than one hundredth of a grain per pound or one part in 700,000 of arsenic and twenty parts of heavy metals per million. This was, of course, a re-affirmation of the arsenic limit suggested by the Royal Commission of 1903, with a suggestion for a limit for metallic impurities. Whilst the preservative section of the Committee's report was adopted, that relating to colours was not given the force of the law, and the only section relating to synthetic colouring matters in the Ministry of Health Regulations of August 4, 1925, was the prohibition of five particular dyestuffs of known toxicity—viz., Picric Acid, Victoria Yellow, Manchester Yellow, Aurantia and Aurine.

The great change, however, which these Regulations made was in the extra powers they gave to Medical Officers of Health in taking samples of foodstuffs for analysis. Prior to their introduction it was only possible for the local officer to examine a sample of the finished foodstuff, and even should the colour contain a very high proportion of arsenic or heavy metals, the infinitesimal quantity of it used rendered the detection of deleterious matter introduced by the use of such colour extremely difficult. That position is now altered. The Medical Officer of Health has power to enter any factory engaged in the manufacture of foodstuffs and take a sample of any article which ordinarily enters into or is used in the composition of or preparation of foodstuffs for human consumption. This, of course, includes colour, and should it be considered injurious to health, the manufacturer is liable to prosecution.

The Departmental Committee's Recommendations, whilst not yet on the Statute Book, have had a very considerable moral effect. There appears no immediate prospect of them coming into force, but I think we can anticipate a still further tightening up

of the Regulations regarding the use of colouring matters in food and any further legislation will, no doubt, be constituted on the lines of the Committee's Recommendations.

Before actually considering the means to be taken by the consumer to ensure that the colours he uses comply with existing standards, it would be as well to explain the complicated and unsatisfactory state of affairs which exist owing to an absence of any statutory interpretation of the Sale of Food and Drugs Act phrase "injurious to health."

One can appreciate that the analyst found himself in an extremely difficult position if called upon to decide whether a colouring matter contained an excess of harmful impurities and, in the case of a prosecution, to convince the court on this point. Whilst he had for his assistance, so far as arsenic is concerned, the Report of the Royal Commission of 1903 and the Departmental Committee's Recommendations of 1924 on metallic impurities, they, as previously mentioned, had no legislative support. The British Pharmacopœia rendered him no assistance, as he found the limits allowed in a number of foodstuff chemicals, used in far greater proportions than colours, were actually higher than that suggested for colours by the above-mentioned committees. This situation could not, of course, continue indefinitely, and recently a Committee was appointed by the Society of Public Analysts and the Association of British Chemical Manufacturers to consider this question. Their report, so far as arsenic is concerned, has been recently published in *The Analyst*, and its conclusions are as follows:

"Pending the legal enactment of a limit by such a body as may be empowered to act, the Committee recommend that the following maximum proportion of arsenic (AS_2O_3) in food colouring matters should be considered as permissible:

(*a*) In a pure (straight) colour, 5 parts per million.
(*b*) In colours not diluted to a greater extent than 2 parts of diluent to 1 part of colour, 3 parts per million.
(*c*) In colours diluted to a greater extent than provided in (*b*), 1·4 parts per million.

The percentage of actual colouring matter present in all cases shall be taken as the difference between 100 and the percentage of diluent."

This report has, of course, no legislative force, but is issued by the Council of the Society of Public Analysts as a guide to analysts as to what may be regarded as reasonable limits to allow for arsenic content in foodstuff colours. It will be noted that the limits suggested by the Royal Commission are not reaffirmed except in the case of highly diluted colouring matters, but the recommended limits are of the same order as laid down in the British Pharmacopœia for such well-known chemicals as glycerine, magnesium sulphate, etc.

The matter has been treated with great discretion and insight by some of our foremost analysts, and the report is remarkable for its lucidity and obvious desire to appreciate the difficulties of both the colour manufacturer and consumer.

The user can take it that these limits represent the basis upon which the public analyst will judge his colours should samples be taken for examination, and it behoves him to see that he obtains the necessary assurance with the colours he buys. The Committee still has under consideration the question of metallic impurities and will, no doubt, publish the result of its deliberations in the near future.

Dilution

The dilution of dyestuffs to a specific strength is recognised as necessary to ensure standardisation, and is not normally regarded as being to the prejudice of the consumer. This practice, however, is often abused, and there are at present on the market many colours which are excessively diluted apparently with the sole object of bringing the arsenic and heavy metal content within the recognised limits, thus enabling the suppliers to give a guarantee of conformity. This is a practice to be strongly condemned, as the consumer uses a correspondingly large amount to tint the foodstuff to the required shade, and the same toxic content is obtained in the finished goods as if an ordinary impure dyestuff is used. The consumer, therefore, should insist not only on receiving colours containing only minimum amounts of arsenic and heavy metals, but that this minimum content should have been attained by careful manufacture and not by the mere process of dilution. This can only be done by insisting that colours should not only be pure, but that they should be as strong as possible.

Other Impurities

There is another phase of the situation, however, which must not be lost sight of. We are rather too prone to think of the word "injurious" as referring exclusively to arsenic and metallic impurities, but I would remind the consumer that there are many other substances likely to occur in food colours which come under this heading, such as organic impurities, aniline derivatives, etc., the presence of which is mainly due to careless methods of manufacture or lack of control during the various stages. These impurities may be quite as harmful as arsenic and metals, and their presence in any excessive proportion in a foodstuff colour would bring it within the meaning of the Sale of Food and Drugs Act. It is essential, therefore, that the consumer obtains his colours from a firm which is acquainted with its history from the earliest stages of manufacture and where methods of control have been brought to a high state of efficiency.

It is the desire of the colour manufacturer generally, to assist in the production of pure material and to do his small part towards sharing the enormous responsibility of providing the public with pure and wholesome food.

The food manufacturer can, without exaggeration, be called the keeper of the nation's health, and if in this great task his business principles are guided by integrity, his present reward will be assured and generations to come will rise up to call him blessed.

The Food Canners' First Exhibition

By DR. STANLEY SMITH, O.B.E.,
Member Research Committee, National Food Canning Council.

THE IDEA of holding a small Exhibition of canned fruits and vegetables was only mooted two or three weeks prior to the date fixed for the Second Annual Convention of the National Food Canning Council. It happens that in the Faithful City of Worcester, one of the most beautiful and hospitable of our country towns, there exists a Public Hall of modest dimensions, and Mr. H. A. Stanley, of Messrs. G. H. Williamson and Sons, Ltd. (to whom so much of the success of the Convention at Worcester is due), set himself to fill this hall with as representative a collection of British canned fruits and vegetables as the short time at his disposal rendered possible. There can be no doubt, in the minds of all who were fortunate enough to witness this display, that future years will see this germ idea develop into an important annual exhibition of the products of the new British industry—an industry which has been organised, co-ordinated, and encouraged by the National Food Canning Council under the guidance of that gifted man of affairs, Sir Edgar R. Jones, K.B.E. It is pleasant to be able to record that every available inch of space was allotted as soon as the fact became known that an Exhibition would be held, and that the twenty-three stands into which the space was divided could have been sold over and over again.

Before dealing with the exhibits of canned produce, which formed the great attraction of the Exhibition, I should like to congratulate the half-dozen firms who were fortunate enough to secure space for showing their "machinery in motion." To the canning trade, the names of these firms are household words. In fact, canning as an industry could scarcely exist without the plant, machinery, and expert advice supplied by engineering houses such as the E. W. Bliss Company, Seals Limited, Max Ams Machine Company (W. E. Hughes and Co.), the Beth Label and Wrapper Machines, Ltd., and Messrs. W. and C. Pantin. The house of Bliss, for instance, has been associated for more than half a century with the production of machinery for making tin cans of every sort and size. To-day there is available the choice between a hand and foot operated equipment, turning out anything from 100 to 1,000 cans a day, and that marvellous machine, the Bliss High Speed Automatic Can Maker, a unit of which is capable of producing no less than 90,000 tin cans in a ten-hour day. Adjoining the Bliss exhibit, Messrs. Seals Limited displayed the "Speedo" method of securing cases, bales, cardboard cartons, and bundles.

It was a pleasure to meet young Mr. Ams, who has just arrived from New York on his first visit to this old country. The "Amsco Junior" high-speed can-closing machine was shown in motion, and sold at sight. It is an automatic, single-spindle closing machine, with a capacity up to eighty cans per minute.

The Beth Label and Wrapping Machines, Ltd., are well-known makers of plant used in many trades. It is a pity the machine on view was silent, and one hopes that next year the Beth Company will display their ingenious plant in actual operation. For the Beth will handle any class of round tin, with or without the lid; it is simple to operate, and all parts are easy of access. The Beth people tell me that a hand worker can usually be relied upon to put on a label "cock-eyed," but a Beth machine cannot commit this absurdity, whilst the use of a non-rusting cement prevents the appearance of rust spots, and thus ensures a brighter and cleaner label.

The machinery shown by Messrs. W. and C. Pantin was much appreciated. This is a firm of very old standing in the City of London, and anything emanating from "Pantin's" must be regarded, invariably, as "a well-considered proposition." We saw in motion the wire-tying machine for wiring boxes, and the gravity roller conveyor for feeding this machine, and taking the boxes away after being tied. Also, a few samples of the "Torroba" boxes were on view—a well-made and reliable package. Whilst on the subject of packing, mention must be made of the "Fiberite" packing cases, shown by Thames Board Mills, Ltd. It is quite true to say of these excellent cases that they "save space, save freight, protect against moisture, and prevent concealed pilferage." In fact, fiberite is attractive and clean in appearance, and advertises the goods the case may contain. The British Basket and Bestoe Company, Ltd., had a good show of fruit baskets, punnets, and suchlike familiar packages.

The remaining item of plant demanding a word of commendation is Kidd's gooseberry grader and blower, which was shown by one of the most active and energetic leaders in the fruit-canning industry, Mr. S. W. Smedley.

A prominent and popular stand was that numbered 16, and occupied by FOOD MANUFACTURE, a monthly journal described in the official catalogue as "the only journal published dealing with the actual making of edibles as an industrial enterprise; specially devoted to canning enterprise." This is, of course, ourselves. Mr. Leonard Hill, who took personal charge of FOOD MANUFACTURE, was very cordially welcomed by numbers of present and future readers.

The rapid growth in the sale of articles of food packed in tins has led to a demand for satisfactory material intended to coat the interior of these containers. Fruit and vegetables, jams, fish, poultry and meat, soups, butters, milk and cheese, are packed for home and export to the value of millions of pounds every year. Now tin-plate is a finished article, and can be examined and approved or rejected on sight. On the other hand, the lacquer or varnish we employ for coating the tin container is, so far as we are concerned, a raw material, and we must depend upon the integrity and skill of the house which supplies this commodity to those who make the tin cans we propose adopting. There are a number of houses in whom reliance can be placed, and amongst them stands pre-eminent the house of Arthur Holden and Sons, Ltd. The anti-acid, non-poisonous gold enamel lacquer, known as "Zinnatine," represents a product I can personally recommend.

The University of Bristol Research Station at Campden is under the direction of an able and practical man of science, to whom the canning industry is very much indebted. Mr. Hirst, the Resident Director, and his assistant, Mr. Adam, a young Cambridge man, were kept busy answering keen enquiries as to the methods they have discovered for preserving the colours of canned fruits and vegetables. If I may venture upon a suggestion in regard to the valuable work being done at Campden, it is to the effect that the canning trade should itself be responsible for the upkeep and maintenance of the Campden Research Station. It appears to me that work of so eminently practical a nature—work producing results of immediate commercial value—should properly be under the control of the industry concerned, in association with the Department of Scientific and Industrial Research, rather than under the auspices of a University, where research of more pronouncedly academic nature is encouraged.

British canners of fruit and vegetables number approximately twenty-five. Of these, room could be found only for ten firms, so that any remarks I may make upon these exhibits must be taken as appreciative of the efforts of the trade as a whole, and not solely of the efforts of the fortunate ten represented at this Worcester Exhibition. It is obvious from the technical excellence of the exhibits that "the latest automatic and hygienic machinery has been installed" in the majority of cases. Unless the British producers sustain a high ideal, they cannot capture the imagination of the housewife. This demands "the highest and most consistent quality of canned fruits, retaining the exquisite flavour which only English fruits possess."

Taking the names of the firms of canners represented at the Exhibition in alphabetical order, they run as follows:

Messrs. Chivers and Sons, Ltd., Histon, Cambridge.

Messrs. J. M. Cope and Son, Newington, near Sittingbourne, Kent.

The Cotswold Packing Company, Ashchurch, Glos.

Messrs. W. R. Deakin and Sons, Ltd., Norton, Worcester.

Messrs. John Greenhalgh, Ltd., Reddish, Stockport, Lancs.

Messrs. Greenwood, Paige and Co., Ltd., Tyburn, Birmingham.

Herefordshire Fruit Company, Ltd., Mansion House, Hereford.

Messrs. Kearley and Tonge, Ltd., Mitre Square, London, E.C. 3.

Messrs. Angus Watson and Co., Newcastle-on-Tyne.

Wisbech Produce Canners, Ltd. Wisbech and Evesham.

These firms gave most attractive and interesting displays of British canned fruits and vegetables, including the following delicious fruits, which I will list as representative of the trade as at present developed:

Apples.	Egg plums.
Bilberries.	Golden plums.
Blackberries.	Pershore plums.
Black currants.	River plums.
Cherries.	Red plums.
Damascenes.	Victoria plums.
Damsons.	Yellow plums.
Kentish damsons.	Raspberries.
Fruit salad.	Red currants.
Gooseberries.	Raspberries and red currants.
Greengages.	Rhubarb.
Loganberries.	Strawberries.

The whole of the foregoing activities and developments depend upon Welsh tin-plate. I was, therefore, deeply interested in the exhibit of the Welsh Plate and Sheet Manufacturers at Stand 20, where samples of the tin-plate as it comes from the works were shown, and a very pretty display of tin cans containing jams, soups, milk, cream, and fish of many varieties, was specially collected together as evidence of the coming activities of the National Food Canning Council in the matter of canning fish, and supplying the home market with milk products derived from cows fed on English pastures. The Council's courteous and clever Hon. General Secretary, Mr. H. W. Packer, was responsible for the valuable collection displayed on the tin-plate manufacturers' stand.

The visitor who firstly examined the tin-plate at Stand 20 had only to turn round and see the tin can as it leaves the box and can-maker's factory. Messrs. G. H. Williamson and Sons, Ltd., the seventy-year-old Worcester firm, exhibited a range of cans which were as perfect in form and finish as the most critical could desire. It is only a few years ago that British-made tins were neither beautiful nor, considered as an engineering proposition, correct. To-day, with the aid of those wonderful American machines to which I have already alluded, we may claim to have produced and to have in standard production a tin can equal in all respects to the best of the American.

Bakers' and Confectioners' Exhibition and Market, Royal Agricultural Hall, London, September 8 to 14.

THE Exhibition authorities announce that they have received from the Industrial Property Department of the Board of Trade a certificate under the provisions of the Patents and Designs Acts, 1907 to 1928, certifying the Exhibition as an industrial exhibition for the purposes of the Acts. This will protect exhibitors showing an invention at this Exhibition, subject to certain conditions, such as giving notice of intention of exhibiting the invention and applying for a patent within six months from the date of the opening of the Exhibition.

FOOD MANUFACTURE is sent to any address in the World for 10s. per annum. Send your subscription now to LEONARD HILL, LTD., Thanet House, 231-2, Strand, London, W.C. 2.

Where are the Bread-wrappers?

By FRED. GROVE-PALMER, A.I.C.

IN THE middle of 1924 the country was convulsed with discussion concerning bread-wrappers.

Where are they now?

Then it was an accomplished fact, not universal, but getting to be so; it was out of the "experimental stage," and the world had said it was good!" The unwrapped loaf was disappearing from the face of the dining table, and the few that were left were to be allowed to get stale for the sake of sufferers from dyspepsia.

"Where are dose wrappers now?"

No one appeared to worry about who should pay for the wrappers; it was a small matter anyway. It is usually the consumer who pays, but the advantages to the bakers who supplied wrapped bread were so great that they could afford to ignore the question. What did it matter who paid? It did not interest the baker, so long as it was not he who was called upon.

The advantages of using wrapped bread are very great. In the first place, the bread keeps moist and fresh very much longer; there is far less risk of loaves growing stale, and consequently the baking need not be quite so accurately judged from day to day; there is more elasticity. In addition, there is less evaporation of moisture and therefore a greatly reduced liability to trouble from shortage of weight. The advertising value of the wrapper is in itself a distinct asset to any baker.

With all these advantages to the baker, the consumer also had protection against the dirty hands of the roundsman and against flies. It is doubtful which of the two perils to health is the greater, but probably the fly is the worse danger, as it can poison food in a second or so, and this it has been doing ever since man began eating food, and possibly before that. Therefore, it was good to have protection from flies on bread. On the meal table many of the foods are protected by covers of one sort or another; in the pantry are still more covers, but the bread upon the table stands bare and open to the attacks of the germ-bearing fly.

The wrapper could be left on the loaf, and when the family supply had been cut off, the ends of the wrapper could be tucked in, and thus the protection was complete. Not, perhaps, a very graceful ornament at mealtimes, but it provided a shield against the attacks of the insidious fly.

Then, too, the wrapper would preserve the bread from growing mouldy in the covered bread pan in the pantry.

And the baker charged one farthing per loaf extra for wrapped bread. The poor people who eat large quantities of bread simply could not afford the extra charge of a farthing on every loaf; those who were better off simply refused to pay the tax when the advantages to the baker were so great, and, after all, it was only the servant who saw the dirty hands of the baker-boy.

The consequence was inevitable. Bread was sent out from the bakeries nicely wrapped; customers refused to pay farthings for paper they did not need, and the roundsmen tore off the wrappers and delivered the loaves by hand as of yore. The situation was Gilbertian, and bread-wrappers quickly died out.

It is by the absolutely foolish mishandling of things in this way that projects of real value for the safeguarding of the public health are brought to ignominious failure.

Death of a Distinguished Engineer

MR. ALEXANDER W. COPLAND, the distinguished engineer and inventor, died suddenly at his home in Birmingham, Michigan, U.S.A., on April 23.

Mr. Copland's name is a household word in the bakery and confectionery trades, for he was the inventor of the Baker-Copland depositing machine. It is not too much to say that there is no factory of any importance in any manufacturing country in the world in which one or more of these machines are not at work.

Alexander Copland was born into the biscuit business, and learned its mysteries in his father's bakehouse. He was keenly interested in mechanics, and, with great tenacity of purpose, acquired a sound knowledge of engineering in his spare time.

He came to England for the first time about thirty years ago at the invitation of the late Mr. J. Allen Baker, and threw himself with great enthusiasm into those British manufacturing problems which differed so widely from those he had faced in his American experience. It was then that his famous machine took shape in his mind, and, on his second visit to this country, he brought the first model with him.

In later life Mr. Copland turned his attention to the design and manufacture of motor-car transmissions, and took out a number of important patents in connection with them.

When the United States entered the Great War Mr. Copland served, without any remuneration, as chairman of the important committee which was charged with the co-ordination of supplies from the whole of the vast automobile industry. He worked, literally, day and night, and by the time the war ended his health was broken. His strong British sympathies had made him chafe under the yoke of his country's neutrality, and when that yoke was removed he put no limit to his activities, so that, as it were, he might make up for lost time.

Two years ago Mr. Copland visited this country again and disclosed to his associates here the plans for a new depositor, which bids fair to mark as important an advance in the art as did his original invention.

Mr. Copland leaves a widow and two daughters. To them the sympathy will go, not only of those who knew him personally (and they are many), but from the wider circle of those for whom his name stood for labour saved and work well done.

Making Clear Ice

By W. E. WARNER

ICE IS usually made by what is known as the can system, the water being frozen in cans or moulds, which are immersed in brine, cooled by the refrigerating machine and left there until the water is frozen solid. The moulds are made with a slight taper to facilitate removal of the ice block; as soon as the surface against the mould thaws, as it quickly does, the ice will slide out. The ice-making tank should be constructed of riveted steel plate; it should be well lagged with some cold-retaining material in the bottom and sides (blocks of cork are quite good for this purpose), and there should be a wooden cover over the top. It is necessary that a vigorous circulation of the brine be maintained, and there must be no stagnant places, and for this purpose a small centrifugal pump or propeller is usually used.

The time taken to freeze depends on the brine temperature; the lower this is the more rapid the freezing. Rapid freezing increases the power required from the refrigerating machine, and the ice produced has a tendency to split when removed from the mould; on the other hand, too slow freezing necessitates a large number of moulds and also a large equipment of machinery, this increasing the first cost. The best temperatures to maintain are, brine temperature 15° F., and an ammonia evaporator temperature of 5° F., the extreme limit of variation being 4° F. With these temperatures the time required for freezing will depend on the thickness of the ice, varying from ten hours with ice four inches thick to sixty-four hours for twelve inches thick.

In most cases it is necessary for the ice to be as clear as possible, except in cases where the ice has to be broken up into small pieces before use. Perfectly clear ice can be produced by using water which has been distilled and de-aerated, but owing to its high cost it is not usually used at the present day. If ordinary water is used the finished ice is not clear, but opaque; this is due to the bubbles of air always present in water, which are released as it freezes; also to any impurities the water may contain. That due to the air bubbles can be prevented by agitating the water as it freezes, or by shaking the moulds; the use of stirring rods has been tried and has proved effective. But the usual way is to cause agitation by blowing air through the water; this removes the discoloration due to air. That due to salts in the water is more difficult; one remedy would be to avoid using such water, or to install a suitable water-softening plant. Owing to the fact that these impurities remain in the water as long as possible, and as the water starts to freeze at the outside, the impurities are driven to the core of the mould which freezes last. This would form an opaque core, but a simple remedy is to pump out the water in the core just before it freezes, and refill it with fresh water. This water will only contain its own natural impurities, whereas the core water pumped out contained its own impurities and the impurities which were driven toward the centre as the outside water froze. The core water should not be pumped out until there is about 5 per cent of the total volume unfrozen; by doing this the discoloration at the core will be reduced to a minimum. Although the discoloration does no actual harm, it spoils the appearance, and this goes a long way, especially if the ice has to be sold.

A New Material for Food Storage

By W. E. WARNER

A MATERIAL which may find extended application in the future for the construction of cold storage rooms, refrigerating plants, and for making boxes, etc., for the transport of foodstuffs is an artificial wood known as Celotex. This is made by a special process from bagasse, a waste product from the sugar plantations. In its manufactured form it resembles sections of wood, and can be obtained in various sizes and thicknesses.

It has valuable properties. It is one of the best insulators of cold and heat at present known; this is due to the fibres of which it is composed containing millions of minute air cells, which are necessary in any heat insulator. It also possesses a high strength, greatly in excess of ordinary wood; this is due to its being composed of compressed fibre, and the external edge of each of these has innumerable small hooks, which engage those of neighbouring fibres, and the greater the tension the harder they grip.

Extensive tests have shown that it has a high resistance to water and moisture, and where it has been submerged for long periods after drying, it has been little affected.

It is also proof against vermin, even to the white ants of the tropics. Many of the insulating materials at present used are deficient in mechanical strength, thus preventing their use for constructional purposes unless suitably supported.

While the insulating properties of Celotex equal those of any other insulator, its high mechanical strength enables it to be used for construction purposes without being specially supported. It can also be used for panelling, suitable sizes being obtainable. With a small air space at the back its insulating value is high. For making cases for foodstuffs its strength and imperviousness to moisture make it valuable; the products in the case are kept at a more constant temperature due to its insulating properties; there is also less difficulty in making moisture-proof cases, as sections the size and shape of a complete side can be obtained.

The Thirty-first Annual Universal Cookery and Food Exhibition

THIS EXHIBITION will assume much greater importance in 1928 than ever before. It will be held in the Main Hall of Olympia from November 23 to December 1.

The promoters of the proposed Exhibition of Hotel, Restaurant, and Club Equipment have agreed to amalgamate with the Cookery and Food Exhibition, so that this should be the greatest exhibition of its kind ever held in London, presenting under one roof the latest developments in Food and Cookery and every form of labour-saving equipment and efficiency device which have now become vital necessities.

The Association are organising a most complete series of Competitions and Demonstrations, which will include, in addition to Domestic Cookery, the Navy, Army, and Air Force Competitions, Red Cross, Scouts and Girl Guides, Invalid Cookery, etc., and special competitions in the Culinary group, in which the chefs of the leading hotels and restaurants throughout Europe will be invited to take part.

Well-known authorities on all matters connected with food and its preparation, etc., will give a series of interesting addresses, and other special features are being arranged, of interest both to the public and the catering trade.

It is confidently expected that this Exhibition will attract a greater attendance of trade and public than any similar Exhibition previously organised.

The Committee

An influential Committee of recognised authorities (including some of the most influential men in the hotel and catering world) has been formed, and the organisers are having the benefit of the advice and guidance of this Committee in the production and conduct of the Exhibition.

The Exhibits

The interest taken in the Exhibition this year by the leading hotel and restaurant proprietors will ensure that the Food Section will derive considerably greater benefit from the Exhibition than ever before. The demonstrations of the preparation and cooking of food have always been exceptionally popular with the general public, but this year exhibitors can confidently look forward to the establishment of many new and important connections among the larger buyers in the hotel and catering businesses.

The Food Section will comprise the following:

Food and Food Products, Cereals, Milk Preparations, Preserved Vegetables and Fruit, Confectionery, Bread, Empire Food and Empire Cookery, Beverages, Cordials, Mineral Waters, Wines and Spirits, etc.

One of the most interesting features of the Exhibition will be the public demonstrations showing the extraordinary advances which are being made from year to year in the preparation of all kinds of foodstuffs.

Equipment

The hotel, restaurant, and catering businesses have developed very rapidly in recent years, and in view of the ever-increasing necessity for improved equipment, a large and important section of the Exhibition will be devoted to that subject. Considerable interest in the Exhibition is being taken by leading hotel and restaurant proprietors, who are giving their wholehearted support. Scientific inventions of the last decade have revolutionised the equipment of modern hotels, clubs, restaurants, railways, steamships, etc., and there is still plenty of room, and very considerable public demand, for vast improvement in most directions.

It is the intention of the organisers to concentrate as far as possible on *new* ideas, inventions, and improvements, which have for their object increased efficiency, greater economy and comfort in hotels, restaurants, clubs, cafés, and catering establishments, etc., etc. The organisers are securing exhibits of the latest labour-saving devices and arranging demonstrations by Exhibitors of a multitude of improvements in the application of gas and electricity to cooking, refrigeration, lighting, heating, ventilation, etc., together with the most modern equipment available for those purposes. Other exhibits will deal with developments in the preparation and serving of foodstuffs. Furnishing and decoration are also subjects in which a considerable interest exists, and ample accommodation will be offered to houses in these trades.

Home and Overseas Buyers

Invitations to this Exhibition at Olympia will be issued to Hotel, Railway and Steamship Proprietors, Managers, Chefs, Staff Managers, etc., in all parts of the world, from large Hotels and Restaurants down to small Boarding Houses, Stores, Clubs, and Institutions.

Widespread invitations will be issued to Overseas buyers, and an interpreter will be provided for those who do not speak English.

Competitions

The competitions in the Domestic Section include Junior, Red Cross, Scouts and Guides, Household and Artisan Cookery, Invalid Cookery, etc.

The Navy, Army and Air Force competitions include Practical Demonstrations of Cookery for Navy and Army Challenge Shields.

In the Culinary Group, special competitions, divided into various classes, are held, in which the chefs of the leading hotels, clubs, and restaurants throughout the country take part.

A special feature will be made of Artistic Confectionery exhibits, Continental Pastries, etc.

In the Bread Section, competitions are held for the Championship Prize, and many additional prizes are competed for in various classes, including Novice Classes.

Books and Correspondence

Book Review

Effective Direct Advertising. Robert E. Ramsay (Appleton and Co., 21/-).

The second edition of this book has been brought up-to-date and considerably enlarged; indeed, it is a most exhaustive work covering the best part of seven hundred pages. From the point of view of the sales manager, it is invaluable, as it covers every phase of direct advertising. It is interesting to note that the earliest trace of this form of publicity dates back to 1000 B.C., when an Egyptian landowner wrote on a piece of papyrus an advertisement for the return of a runaway slave.

Its progress is dealt with from those ancient days to the present time in an exceptionally lucid and engrossing manner, and no side of the art is omitted. The exact purpose of direct advertising is defined, together with its range and limitation; the compilation of sale letters, catalogues, booklets, etc., right down to the lesser used forms, such as poster stamps, novelties, broadsides, is fully explained, together with the psychological effects of each. If the reader wants to know the standard size of a miniature catalogue, as distinguished from a loose leaf or a regular catalogue, here it is. If he wants to know the exact function of the house organ, Mr. Ramsay has it clearly laid down. If he wants to design a booklet, he will obtain here the best colour schemes with suitable boards and papers. Should he think that the style and size of his letter-heading is of no sales importance, let him read and take warning.

Layouts and typography have their chapters, as has also the process and printing side. There are outlined schemes for checking the results of direct advertising campaigns, and indeed, any and every possible problem that could ever arise is fully and helpfully explained. The author occasionally drives home his points in amusing fashion, as, for example, when he insists upon the necessity for exact definition, he cites the case of an old lady who, in making two sorts of pies, marked one lot "T.M." for "'Tis Mince" and the other lot, made of apples, "T.M.," "'Tain't Mince."

The only possible criticism that can be levelled at the book is that it might be condensed by a good third, as Mr. Ramsay, in his anxiety to leave nothing out, is redundant in parts. Nevertheless, it should be in the library of every business house!

Books Received

Copra and Coconut Oil. Katherine Snodgrass, Research Associate, Food Research Institute, Stanford University, California. No. II. of Fats and Oils Studies of the Food Research Institute. Pp. 135. London: P. S. King and Son, Ltd., 1928.

The Book of Green Vegetables. How to Choose and Serve them in 200 Different Ways. M. Gold and E. Gilbert. Pp. 190. New York: D. Appleton and Co., 1928.

Abstracts of Papers Read before the Society of Public Analysts on Wednesday, May 2, 1928.

Locust Kernel Gum and Oil. By A. L. Williams, A.I.C. (Work done under the Analytical Investigation Scheme.)

Locust kernel gum has recently been used as a thickening agent for sauces. An outline is given of the nature of the gum, and its reactions, as compared with those of gum tragacanth and other gums. The reactions with tannin, borax, and Fehling's solution are the most characteristic. As little as 1 per cent. of the gum may be separated from sauce or jam by treatment with tannin.

The constants of the kernel oil have been determined (iodine value, 98·4). The oil gave a negative result in the antimony trichloride test for Vitamin A.

The Examination of Liquorice Mass. By P. Howeman, Ph.D., F.I.C.

Standard methods of analysis and the method of stating the results of analysis are described in detail. In view of the fact that stick liquorice adulterated with starch is now extensively sold in England, a test to detect this adulteration has been devised. Occasionally the added starch is boiled so as to destroy the individuality of the granules, but usually it is possible to discover a few granules that have escaped disintegration.

Correspondence

TO THE EDITOR

DEAR SIR,

In the May issue of your journal there is a letter from Mr. H. Holden calling attention to a statement I made in my article "History of Food Laws," published in your issue of April last. The statement to which he takes exception, and which he states is "misleading" and "incorrect," is as follows: "The Act makes it clear that an article of food sold must be of the nature, substance, and quality of the article demanded—all three, not only one or two of them.'

I think if your correspondent will carefully consider the conditions necessary to avoid a conviction by reason of the article not being deficient in nature, or in substance, or in quality—not necessarily the three of them, but only any one of them—the article must be of all three: nature, substance, and quality. This seems to be the logical conclusion. If so, my statement is correct.

T. G. JOYCE.

Foreign News

Northern Ireland

THERE IS a growing demand in Northern Ireland for canned "pork and beans," which until about a year ago were almost entirely of American origin. During the past twelve months, however, Canadian packers have introduced their goods, and, aided by the Empire Marketing Board, are underselling the United States' product. For example, No. 2 tins of American pork and beans cost $1·09 per dozen, wholesale, while the Canadian goods can be bought for 97 cents per dozen.

Canadian Lobster Canning

With the object of improving the quality of lobsters and lobster paste packed in the Maritime Provinces, the Halifax Experimental Station of the Biological Board of Canada gave a course on the canning of lobsters during the last two weeks of March.

Condensed Milk in Cuba

According to information furnished by the American Commercial Attaché Todd at Havana, the Nestlé Anglo-Swiss Condensed Milk Company is trying to establish a condensed milk plant near Bayamo in the eastern part of the island. It is understood that this idea has the backing of the Cuban Department of Health.

Mr. Todd is also informed that a special dairy and laboratory has been established near Guanajay, about thirty-five miles west of Havana, where milk will be treated according to special formulas for the use of infants and sick people. This plant has just been inspected by the officials of the Health Department. In the enthusiastic way in which all these new enterprises are discussed, it is said that this laboratory has found the way of treating cow's milk so as to bring it almost exactly to the consistency and properties of mother's milk. The process, however, is said to be very expensive.

Condensed Milk in Peru

By a Supreme Resolution of February 24, a local applicant, Sr. Alfredo Garland Daponte, of Lima, has been granted a ten-year concession for the manufacture of "condensed and evaporated milk" in the country, according to a report of April 9, 1928, from the American Commercial Attaché at Lima, Peru. A copy of the Resolution with the terms of the concession will be found in *El Peruano* of April 3.

Canned Meats in Switzerland

Dealers report a fair trade during the past year in canned meats, principally corned beef and ox tongue, although the imports were about £3,100 less than in the previous year. The total imports were valued at about £56,300. The greater quantities came from Argentina and France, while only about 10 per cent. of the total is credited to the United States. A large portion of the imports from Argentina, however, was supplied by American firms having branch establishments in Argentina.

Aluminium Cans

German manufacturers are carrying on experiments with a view of testing the adaptability of aluminium for canning purposes, but without conclusive and final results so far, according to information contained in a recent letter to a member of the trade from the American Commercial Attaché at Berlin, Germany.

In favour of adopting aluminium is the possibility of re-using this material by having the emptied cans returned to the factory, where they are worked into new cans. It is feared, however, that the return of the cans to the factory will be a troublesome matter and not many cans will come back. Besides, aluminium is much higher in price than tin sheets, and there is also difficulty in soldering the cans, as aluminium does not take readily to soldering.

Taken as a whole, the chances of aluminium cans replacing tin cans are poor, and the experiments referred to are not expected to be productive of striking results.

Concentrated Milk

Trade Promotion Series No. 57, entitled "International Trade in Concentrated Milk," has recently been published by the Department of Commerce, U.S.A.

This bulletin contains a comprehensive survey of the concentrated milk industry throughout the world, and is arranged in the following manner: (1) A history of the industry, with a description of the varieties of concentrated milks, methods of manufacture, and uses for the products; (2) production statistics, with a study of the economic phases of production in the principal countries; (3) world competition, with a description of changes in world trade; and (4) a discussion of the present markets for concentrated milks in the principal consuming countries.

Copies of this bulletin may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. The price is 15 cents per copy.

Canned Foods in British Malaya

Trade Information Bulletin No. 534, entitled "Market for Canned Foods in British Malaya," has recently been published by the Department of Commerce, U.S.A.

Sardines enjoy the largest sales in British Malaya, followed by canned milk, salmon, vegetables, and fruits of all kinds. The total value of canned foods exported from the United States to that market during 1926 amounted to $1,382,036. It is believed that American manufacturers, not realizing the importance of the Malayan market, have not sufficiently concentrated their efforts in that area.

Copies of this bulletin can be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. The price is 10 cents per copy.

Canned Fish in South Africa

During the year 1926 the total imports of tinned fish into South Africa amounted to approximately 8,800,000 pounds. Of this total the United States supplied about 400,000 pounds, the United Kingdom about 1,700,000 pounds, Canada 2,500,000 pounds, and Norway about 2,400,000 pounds. The total imports have been fairly consistent during the last five years, but the imports from the United States have been decreasing, due to the increasing competition from Canada and the European continent.

Canned Foods in Nova Scotia

The trend of future buying tends toward local products. Increased quantities of canned goods have been imported from England of late, but this source of supply is not expected to be extensive. Local production is rapidly increasing, and the Provincial Government is assisting in its development. In Pictou County, the Department of Natural Resources for the Province has arranged with a lobster factory at Bayview to have installed such extra machinery as is necessary for canning of beans, peas, and other products. A considerable quantity of these vegetables was reported as being packed by this plant in the latter part of the canning season. Another instance of the work which the Department sponsored is at Meteghan, where a canning factory established by the Department within the past year more than trebled production and now has been taken over by a local merchant.

This year some twenty-five farmers have contracted to grow small areas of peas for purposes of furthering the development of canning peas. Four varieties of peas were experimented with in 1927—the Alaska, Advance, Surprise, and the Green Admiral. Of these the Alaska proved the most satisfactory. Altogether some 1,100 cases were canned last year, and although this was not a large quantity, it is important to note that the trade has been highly impressed with the quality of the pack. Experiments with the foregoing varieties of peas were carried on at several centres in the province, and excellent results are reported, especially those localities near the sea, where the humid conditions seemed favourable to the growing of an extra fine quality of tender peas—most satisfactory for canning. This experiment, it is stated, will be further developed by the Government during 1928, and it is hoped will prove the forerunner of a very substantial industry in the province.

Fish Canning Industry in Goteborg, Sweden

The new factory in Goteborg, to be erected by the Aktiebolaget Sveriges Forenade Konservfabriker of Goteborg, on which work has progressed to the extent of preparing the ground, is being erected in that city close to the harbour front where larger vessels can dock, in the vicinity of the fish harbour where the local catch of fish is brought into port, and on the line of the harbour railroad over which railway cars can be brought to the doors of the factory. It is expected that the new factory will be ready to begin operations by the close of this year, and when completed will be the largest of its kind in Europe.

The main building will have a length of 220 feet and a wing building attached a length of 140 feet; both buildings are to be five stories high, besides a storage basement or cellar, and will be built of concrete, granite, and brick.

The cold-storage equipment will be located in the basement and on the ground floor, and will enable the temperature to be lowered to about 10° F.; this department will occupy a floor space of 10,760 square feet. The ground floor will also furnish accommodations for the factory office, engine-room and fire-room. The second floor will be taken up by a large hall equipped for canning salted and spiced fish that are not sterilised, such as spiced sprats, herrings, etc., and by wardrobes, toilet rooms, and shower baths for the use of employés. The fish cleaning and caviare canning departments and the preserving kitchen with sterilisation equipment will occupy the third floor; the shop for the manufacture of tin cans, of which about fifty different kinds are used, will occupy almost the entire fourth floor; and the fifth floor will be devoted to a section equipped for the canning of peas and to the manufacture of packing-cases.

This company will also enlarge and modernise a factory it is operating at Lysekil, a town on this coast north of Goteborg. The factory there, when completed, will have a length of about 360 feet, a depth of about 72 feet, and a height of about 55 feet, and its capacity will be more than doubled.

Tomato Sauce and Ketchup in South Africa

The market for imported food products of this kind is limited almost entirely to the better class hotels, restaurants, and homes. During the year 1926 there was imported into the whole of South Africa approximately 92,000 pounds of tomato ketchup. Of this total, 59,000 pounds came from the United States and 11,000 from the United Kingdom. Imports from the United States have been fairly consistent within the last four or five years.

Commercial and Legal News

London Gazette Information

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

IMPORTATION OF RAW CHERRIES ORDER OF 1928.

The Minister of Agriculture and Fisheries has made the above Order under the Destructive Insects and Pests Acts 1877 to 1927. The effect of the Order is to prohibit the landing in England or Wales after June 5 of cherries grown in the Southern District of France, and after June 12 of those grown in the central area, as defined in the Schedule to the Order. After June 21 the importation of cherries grown in any part of France is entirely prohibited.

Cherries grown in Italy must be accompanied by a certificate of origin until June 16, after which date their importation is prohibited.

Cherries imported from other European countries after June 5 must be accompanied by a certificate of origin. The certificate prescribed in the Order must be delivered to the Officer of Customs and Excise with the entry relating to the consignment.

An Inspector of the Ministry may enter any premises and open, examine, and take samples of any cherries shipped or believed to have been shipped from any European country; any person wilfully obstructing or impeding an Inspector in the exercise of these powers is liable to a penalty of £10, or in respect of a second or subsequent offence, to a penalty of £50.

Copies of the Order may be obtained on application to the Secretary, Ministry of Agriculture and Fisheries, 10, Whitehall Place, S.W.1.

Voluntary Liquidations.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

ASSOCIATED BUTCHERS, LTD. Resolved, May 4, that the company cannot, by reason of its liabilities, continue its business, and that it be wound up voluntarily, and that Mr. E. R. Carr, I.A., 11, Bowling Green Street, Leicester, be appointed liquidator.

MILK FOODS, LTD. Resolved, April 14, that the company cannot, by reason of its liabilities, continue its business, and that it be wound up voluntarily, and that Major J. Francis, D.S.O., Auctioneer, of Carmarthen, be appointed liquidator.

Meetings to Hear Liquidator's Report.

THE ST. ALBANS MINERAL WATER CO., LTD., (in voluntary liquidation). General Meeting of Members of this company will be held at 12, London Road, St. Albans, on June 6 at 12 noon. Liquidator, Mr. G. W. Baker.

THE OXFORD FLOUR CO., LTD. (in voluntary liquidation). General Meeting of Members of this company will be held at 3, Queen Street, Oxford, at 3 p.m. on June 11. Liquidator, Mr. W. R. Francis.

New Companies

WORLD'S SUPPLIES, LIMITED. (229599) Regd. April 11, 1928. 432, Sentinel House, Southampton Row, W.C.1. To carry on the bus. of mnfrs. and mchts., grocers and provision dlrs., etc. Nom. Cap.: £100 in £1 shares.

WHITE BROTHERS, LIMITED. (229728) Regd. April 16, 1928. To take over the bus. of millers and grain mchts. and dlrs. in cereals, etc., cd. on at 8-14, Maguire St., and 63, Paul St., Liverpool, as "White Brothers." Nom. Cap.: £10,000 in £1 shares.

WEST SUSSEX DAIRIES, LIMITED. (229727) Regd. April 16, 1928. To carry on the bus. indicated by the title. Nom. Cap.: £2,000 in £1 shares.

ALLEN'S BOILED BEEF HOUSES, LIMITED. (229693) Regd. April 16, 1928. 16, Brushfield Street, E.1. To carry on the bus. indicated by the title. Nom. Cap.: £1,000 in £1 shares.

WAINWRIGHTS (MANUFACTURING), LTD. (229780) Regd. April 18, 1928. To carry on the bus. of mnfrs. of and dlrs. in aerated and mineral waters, etc. Nom. Cap.: £1,000 in £1 shares.

F. L. VEALE AND COMPANY, LIMITED. (229764) Regd. April 18, 1928. 25, Queen Street, Newton Abbot, Devon. To take over the bus. of a grocer and provision mcht. heretofore cd. on at Newton Abbot. Nom. Cap.: £500 in £1 shares.

FENN AND CO. (FARNHAM), LIMITED. (229760) Regd. April 18, 1928. To carry on the bus. of mnfrs. of and dlrs. in mineral and aerated waters, etc. Nom. Cap.: £500 in £1 shares.

G. A. SPROTT, LIMITED. (229792) Regd. April 19, 1928. To take over the bus. of a grocer and provision mcht. cd. on at 53, South End Road, and 295 and 571, Finchley Road, Hampstead, 2 Station Parade, Acton, and Ashbourne Parade, Temple Fortune, Hendon, as "G. A. Sprott." Nom. Cap.: £15,000 in £1 shares.

GRADE "A" MILK, LIMITED. (228890) Regd. March 17, 1928. To take over the bus. of retailers of Grade "A" and other milk and farm produce cd. on at Barn Bank, nr. Stafford, by Clare Stephenson. Nom. Cap.: £250 in £1 shares.

C. AND F. BAKER, LIMITED. (229788) Regd. April 19, 1928. 37, Marine Terrace, Margate. To carry on the bus. of bakers, contractors for the supply of refreshments, etc. Nom. Cap.: £100 in £1 shares.

JAMES KINGDOM, LIMITED. (229737) Regd. April 17, 1928. To carry on the bus. of licensed grocers, wine and spirit mchts., etc. Nom. Cap.: £1,000 in £1 shares.

CONSUMERS' MEAT STORES, LIMITED. (229971) Regd. April 26, 1928. 45, Beeston Road, Leeds. To take over the bus. cd. on at 55, Town Street, Armley, Leeds, as "George Senior." Nom. Cap.: £1,000 in £1 shares.

COAST DAIRIES, LIMITED. (229972) Regd. April 26, 1928. Jubilee Street, Llandudno. To carry on the bus. of dairymen, etc. Nom. Cap.: £500 in £1 shares.

SEAMAN'S DAIRIES, LIMITED. (228837) Regd. March 15, 1928. 1, Guildhall Chambers, Basinghall Street, E.C.2. To take over the bus. cd. on by B. Thorpe; and to carry on the bus. of dairymen, etc. Nom. Cap.: £2,000 in £1 shares.

WILLIAM MARCROFT AND CO., LIMITED. (228844) Regd. March 15, 1928. To carry on the bus. of mnfrs. of and dlrs. in patent, proprietary, and other foods, etc. Nom. Cap.: £5,000 in £1 shares (4,000 pref. and 1,000 ord.).

UNITED FOOD PRODUCERS, LIMITED. (228843) Regd. March 15, 1928. To carry on the bus. indicated by the title. Nom. Cap.: £100 in £1 shares.

FRED ROBSON, LIMITED. (228917) Regd. March 19, 1928. To take over the bus. of a pork butcher and provision mcht. cd. on at Carlisle as "Fred Robson." Nom. Cap.: £7,000 in £1 shares.

KENT AND SUSSEX WHOLESALE BUTCHERS AND GRAZIERS, LIMITED. (228921) Regd. March 19, 1928. 1a, Terminus Buildings, Eastbourne. To take over the bus. of graziers and butchers, etc., cd. on by G. Sargent, L. Pocock, M. F. Boniface and Brothers, A. E. Austen, jnr., and A. E. Austen, senr. Nom. Cap.: £10,000 in £1 shares.

WILLIAM STORER, LIMITED. (228935) Regd. March 19, 1928. Aldwych House, Aldwych, W.C.2. To take over the bus. of an importer and exporter of and dlr. in dairy plant and machinery cd. on at Aldwych House, W.C. Nom. Cap.: £10,000 in £1 shares (3,000 pref. and 7,000 ord.).

W. H. FELTHAM, LIMITED. (228873) Regd. March 16, 1928. 15, Kensington, Bath. To take over the bus of a grocer and genl. dlr. cd. on at Longbridge, Shepton Mallet, Somerset, as "W. H. Feltham and Son." Nom. Cap.: £1,500 in £1 shares.

VITAMINS (1928), LIMITED. (229017) Regd. March 21, 1928. 80, Bishopsgate, E.C.2. To enter into an agreement with Vitamins, Ltd., and its liqdr., and to carry on the bus. of dlrs. in grain, meal, and flour, etc. Nom. Cap.: £50,000 in 1/- shares. Minimum subsn., 7 shares.

STEPHENSON AND CLARK, LIMITED. (229015) Regd. March 21, 1928. To enter into an agreement with Stephenson and Clark, of Albemarle Back Rd., Scarborough, grocers and provision mchts., etc. Nom. Cap.: £600 in £1 shares.

SOWTERS, LIMITED. (229016) Regd. March 21, 1928. Court Chambers, North Street, Keighley. To take over the bus. cd. on at Keighley as "J. R. W. Sowter," and to carry on the bus. of bakers and confectioners, etc. Nom. Cap.: £5,000 in £1 shares.

NOTTINGHAM DIRECT FAMILY SUPPLY, LIMITED. (229009) Regd. March 21, 1928. To carry on the bus. of mnfrs. of and dlrs. in aerated and mineral waters, etc. Nom. Cap.: £100 in £1 shares.

J. F. DEWIS AND SONS, LIMITED. (228831) Regd. Mar. 15, 1928. 38, King Street, Bedworth. To take over the bus. of bakers, confectioners, and corn mchts. cd. on at Bedworth, Warwickshire, as "J. F. Dewis and Sons." Nom. Cap.: £5,000 in £1 shares.

FROZEN FOOD PRODUCTS, LIMITED. (228783) Regd. Mar. 14, 1928. To take over the bus. of producers, mnfrs, and dlrs in eggs, food, and fruit, etc., cd. on by J. W. N. Vassie and A. H. Penfold. Nom. Cap.: £1,000 in £1 shares.

FREDERICK KIDD AND SONS, LIMITED. (229897) Regd. April 23, 1928. 37, Oulton Road, Stone, Staffs. To carry on the bus. of bakers and confectioners, etc.

SERVICE FOOD COMPANY, LIMITED. (229931) Regd. April 24, 1928. To carry on the bus. of mnfrs. of and dlrs. in grain, flour, meals, bread, etc. Nom. Cap.: £2,000 in £1 shares.

W. N. KEELY, LIMITED. (229968) Regd. April 25, 1928. Croft Street, King Street East, Stockport. To take over the bus. of grocers and provision dlrs. now cd. on at Stockport as "W. N. Keely." Nom. Cap.: £2,000 in £1 shares.

Trade Publications

Amalgamated Dairies, Ltd., 3, *Laurence Pountney Hill, London, E.C.*4. Booklets describing the application of the "Anchor" Milk Powder in the preparation of ice cream, confectionery, bread, biscuits, and so on. One of the booklets gives twenty-two excellent recipes; the other deals with the use of milk solids, unsalted butter and water, with an "Emulsor," in making ice cream.

Sulzer Bros., 31, *Bedford Square, London, W.C.*1. A booklet illustrating the "Maag Gears." Advantages claimed are, reduction of wear to an insignificant figure, maintenance of efficiency, and smoothness under the most severe conditions of service, large ratios of reduction, heavy tooth loads, simplicity of erection, and compact units.

Jagenberg, Ltd., 332B, *Goswell Road, London, E.C.*1. A booklet giving particulars of the activities and history of this firm, well known as inventors and makers of paper-working and packeting machinery, and as manufacturers of adhesives and gummed papers. This business was founded fifty years ago by F. E. Jagenberg, a member of an old family of papermakers. The firm at first built up a successful business as paper merchants; later came various inventions. Jagenbergs invented and constructed at an early period machines to gum paper in coils and sheets, which gradually revolutionised the manufacture of cardboard boxes. Then followed many types of labour-saving machinery, including automatic packeting and labelling plants. Emil Jagenberg, President of the Company, has had the satisfaction of seeing his endeavours for the paper-working industry rewarded by an honorary degree of doctor of engineering.

Current Literature

Fruit and Vegetable Products

Investigations of the Use of Fruits in Ice-Cream and Ices, II. G. D. Turnbow and W. V. Cruess. (*Fruit Prods. Jour.*, 1928, April, 9.)

Pickling Olives by the Modern Greek Process. S. A. Kaloyereas. (*Fruit Prods. Jour.*, 1928, April, 14.)

Waterless Processing of Vegetables. K. L. Ford and A. G. Osborne. (*Glass Container*, 1928, March, 5.)

Physical and Chemical Changes of Grimes Apples during Ripening and Storage. H. H. Plagge, A. J. Maney, and F. Gerhardt. (*Iowa Agric. Exp. Sta. Res. Bull.*, 1926, 91.)

The Vitamins of Orange Juice. S. G. Willimott. (*Biochem. Jour.*, 1928, 22, 67.)

Dairy Products

Hygienic Evaluation of the Biological Properties of Milk. M. A. Dychno and O. M. Briskin. (*Zeit. Unters. Lebensm.*, 1927, 54, 438.)

Determination of Lecithin-Phosphoric Acid in Egg Liqueurs. J. Grossfeld. (*Zeit. Unters. Lebensm.*, 1927, 54, 450.)

Flies as a Source of Contamination in the Handling of Milk. N. G. Gruber and W. A. Hoy. (*Farming*, 1928, April, 359.)

Nature of the Neutralisation Precipitate and its Effect on the Recovery of Milk Sugar from Grain—Curd—Casein Whey. R. W. Bell and P. N. Peter. (*Ind. and Eng. Chem.*, 1928, May, 510.)

Refraction of Milks with Less than 8·5 per cent. of Solids-Not-Fat. G. D. Elsdon and J. R. Stubbs. (*Analyst*, 1928, 150.)

"Alkalinity" of Milk and its Electrolytic Determination. Z. von Marikovszky and E. Linder. (*Chem.-Ztg.*, 1928, 52, 283.)

Pimento for Colouring Egg-Yolks. W. A. Morgan and J. G. Woodruff. (*Ga. Exp. Stat. Bull.*, 1927, 147, 210.)

Studies on the Effect of Heat on Milk, IV.: The Iodine Content. H. E. Magee and A. E. Glennie. (*Biochem Jour.*, 1928, 22, 11.)

Chemical Composition of the Milk of Cows receiving Cod-Liver Oil. E. C. V. Mattick. (*Biochem. Jour.*, 1928, 22, 144.)

Influence of the Cow's Diet on the Fat-Soluble Vitamins of Winter Milk, II. J. Golding and S. S. Zilva. (*Biochem. Jour.*, 1928, 22, 173.)

Microbic Flora of Frozen Eggs. J. Verge and E. Grasset. (*Compt. rend.*, 1928, 186, 718.)

Cereal Products

Loss of Chlorine in Ashing of Flour. W. von Bruchhausen. (*Zeit. Unters. Lebensm.*, 1927, 54, 485.)

A Study of the Proteoclastic Activity of Flour. A. Cairns and C. H. Bailey. (*Cer. Chem.*, 1928, March, 79.)

Wheat and Flour Studies: (XIV.) Factors influencing the Viscosity of Flour-water Suspensions; (III.) Effect of Small Quantities of Carbon-Dioxide in Water used for the Extraction of Electrolytes. A. H. Johnson and B. L. Herrington. (*Cer. Chem.*, 1928, March, 105.)

Effect of Severe Weathering on Certain Properties of Wheat. W. O. Whitcomb and A. H. Johnson. (*Cer. Chem.*, 1928, March, 117.)

Effect of Delayed Harvesting on Quality of Wheat. A. F. Bracken and C. H. Bailey. (*Cer. Chem.*, 1928, March, 128.)

Influence of Size and Shape of Pan on the Baking Test. J. P. Lewis and W. O. Whitcomb. (*Cer. Chem.*, 1928, March, 146.)

Standard Experimental Baking Test. M. J. Blish. (*Cer. Chem.*, 1928, March, 158.)

Various

Determination of Stone-Cells in Cacao Products. E. Alpers. (*Zeit. Unters. Lebensm.*, 1927, 54, 462.)

Fish Meal as a Food for Animals and Poultry and an Improved Continuous Process. R. A. Bellwood. (*Jour. Soc. Chem. Ind.*, 1928, No. 17, 433).

Reports of the Essential Oil Sub-Committee to the Standing Committee on Uniformity of Analytical Methods: (I.) Determination of Acetylisable Constituents; (II.) Determination of Phenols. (*Analyst*, 1928, April, 214.)

Impurities in Colouring Matters used in Food: Arsenic. (*Analyst*, 1928, April, 217.)

Advertising and the Will to Buy. R. J. Bartlett. (*Jour. Nat. Inst. Industrial Psychology*, 1928, January, 18.)

The Newer Knowledge concerning Alkali Detergents used in Automatic Bottle-Washing. M. E. Parker. (*Glass Container*, 1927, September, 13.)

The Tinting of Foodstuffs. H. Drake-Law. (*Jour. Soc. Dyers and Colourists*, 1928, March.)

Grading of Commercial Gelatin and its Use in the Manufacture of Ice-Cream, II. A. C. Dahlberg, D. C. Carpenter and J. C. Hening. (*Ind. and Eng. Chem.*, 1928, May, 516.)

The Spore-Forming Bacteria and Spoilage in Canned Food. G. Grindrod. (*Canning Age*, 1928, May, 449.)

Hydrogen Ion Concentration of Honey and Artificial Honey. J. Fiehe and W. Kordatzki. (*Zeits. Unters. Lebensm.*, 1928, 55, 59.)

Separation of Honey. J. Fiehe. (*Zeit. Unters. Lebensm.*, 1928, 55, 64.)

The Rancidity of Coconut Oil produced by Mould Action. W. N. Stokoe. (*Biochem. Jour.*, 1928, 22, 80.)

Recent Patents

These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

12425. CARTER, LTD., J. H.: Separation of pulp, etc., from fruit pips. May 1.

13050. KERR, H. H., and O'CONNELL, J.: Treatment of butter. May 3.

13093. MERRICK, A.: Means for arresting decay, etc., of fruit. May 4.

11928. GARDNER, D.: Manufacture of pure colophony, etc. April 23.

11933. LA VAUZA, G.: Apparatus for concentration of juice, etc. April 23.

Specifications Published

289,601. MACKESON, H.: Manufacture of beverages, etc.

289,653. LAVENDER, P. C., and SHERMAN, A. E.: Preservation of food.

259,948. CALIFORNIA FRUIT-GROWERS' EXCHANGE: Pectin product and process of producing the same.

288,770. AVERY, LTD., W. and T., and JOHNSON, S. H.: Tea-milling machines.

274,051. MILES, E. H., and REILLY, G.: Preparation of vegetable food.

Printed copies of the full published specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. *each.*

Abstracts Published

287,119. **Sugar.** POHLMANN, J., 33, Nieuwe Rijn, and RASSERS, R. F., 47, Rapenburg, both in Leiden, Holland.

Purifying saccharine liquids; sugar preparations.—Albuminous substances are removed from an acid or neutral saccharine juice by the addition of tannin, tannin compounds or derivatives, methyl alcohol, picric acid, phosphoric-tungstenic acid, or phosphoric-molybdenic acid. The process is carried out at normal temperature, slaked lime being added to remove excess of tannin. A second crystallisation may be obtained, or the molasses may be concentrated for the preparation of treacle.

279,443. **Gelatine solutions.** I. G. FARBENINDUSTRIE AKT.-GES. October 15, 1927. (Not yet accepted.) Solutions of gelatine are made by peptonising gelatine in the presence of water by an alkaline or alkaline earth hydroxide, with exclusion of other electrolytes, and adding an organic solvent or diluent. By mixing such a solution with an organic acid—*e.g.*, acetic acid, or another gelatine solution in an organic solvent made with the aid of an acid, the pH of the product may be varied. An example of an alkaline solution comprises gelatine, methyl and ethyl alcohols, 30 per cent. barium hydroxide solution, and water. An acid solution comprises gelatine, methyl and ethyl alcohols, benzene, glacial acetic acid, and water.

285,115. **Drying sliced sugar-beet, etc.** B. J. OWEN, Institute of Agricultural Engineering, Oxford University.

Temperature, pressure, and velocity of flow of: air, regulating; crops, storing.—Vegetable substances or products of an organic nature and particularly sliced root crops, such as sugar-beet, are dried either in stationary or moving columns or layers of relatively small thickness by the passage of a current of air repeatedly through the substance; the pressure, volume, and temperature of the air, the thickness of the substance, and the time of treatment being co-ordinated so that the drying is effected efficiently. Sugar-beet may be dried in a stationary column or layer of from 8 to 12 inches in thickness, with air at a pressure of from 1·5 to 2·5 inches of water and a temperature of from 180° to 212° F. for about an hour, the air leaving the beet in a saturated condition at a temperature of from 80° to 90° F., and a velocity of from 230 to 280 feet per minute. The weight of air required is from 1,200 to 1,400 pounds per minute, per ton of beet. In a modification the beet may be dried either in continuous or intermittent motion in a column or layer of from 5 to 9 inches in thickness with air which is passed through the beet three times, the temperature of the air being graduated from 190° to 220° F. for the first traverse through the almost dry beet, from 220° to 250° F. for the second traverse, and from 250° to 320° F. for the final traverse through the wet beet. Specification 267,203 is referred to.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

GEM

488,725. **Margarine.** A. J. MILLS AND COMPANY, LIMITED, Colonial House, Tooley Street, London, S.E.1. May 9.

HOME CIRCLE

488,801. **Margarine.** ENGLISH MARGARINE WORKS, LIMITED, 35, Broad Green Road, near Liverpool. May 9.

WHITE CLOVER

478,091. **Eggs, in class 42.** CHRISTOPHER GOULDING NICHOLSON, White Hart Buildings, Penrith, Cumberland. May 2.

HYBLA

489,641. **Honey.** JOHN SPAVROS TSIPIS, 129, Finsbury Pavement, London, E.C.2. May 2.